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October 2002 Issue 251



Editor's Comment

How much do you value the hard work of the RISC OS dealers? A lot? A little? Not at all? I suspect the latter attitude is the one that infests the mind of some people in this market, because they treat the dealers with contempt.

Let me tell you a story: A man spent twenty five years as an engineer in a power plant, he knew everything about it and it always ran smoothly. Then one day he was made redundant. Only a few months later his old employer came to him because things were going wrong at the old plant. He came in, listened to the machinery for a moment and within half an hour fixed it. Then he presented his invoice for £25,050. There was outrage at the cost and they demanded he explain. "That's easy," he said. "£50 for the time and £1,000 for each year of experience you're using."

The RISC OS dealers are very experienced and they know what they're talking about. Plus they tend to be very helpful, willing to give their advice in tricky situations and not charge for it. But some people take advantage, they pick the brains of the dealers then, once they have the information, go off and buy from somewhere else where they think it's cheaper. Then when they get a problem they call the RISC OS dealer again for help.

It is contempt and it is self-defeating. How long would you stick at a job if you were taken for granted? If instead of abusing their willingness people provided good and fair exchange by buying from them: they will stay around and will be there the next time you need help.

That which you abuse, you lose.

Rob Donaldson
Editor

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All monitors inc 3 yrs wty unless specified

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units are refurbished with 90 days wty

HP laser differs from one shown

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60.0GB *	£72.34	£85.00
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OFFICIAL ORDERS by MAIL or FAX please
Carriage charges inc. ins. & packaging charged at cost
Small items (under 2Kg).....no more than £6 + vat
One box of items totalling upto 25kg...£7.00 + vat
Computer systems.................................£14 + vat
All prices are correct going to press. E&OE
All goods are fully guaranteed but not supplied on approval.

South East Show Latest

The organisers are making final arrangements for the RISC OS South-East show to be held on 2nd November at Guilford College. The show is being organised by the Surrey and Sussex Acorn User Group in conjunction with Fillin Ltd.

The show promises to be an outstanding success and is exceeding the organisers most optimistic expectations. From late August all stands have been booked and the organisers are trying to squeeze in one or two more, since there is now a waiting list!

Current exhibitors are:

Acorn Publisher
Acorn User
APDL
Archive
ARM Club
Association of Acorn User Groups
Castle
Cerilica
CJE Micros
Electronic Font Foundry
Fortran Friends
Icon Technology
ITC
Martin Wuerthner
Net BSD
Peter Naulls (Unix porting project - see separate new item)
Paul Vigay
Photodesk
RComp
RiscStation
Serious Statistical Software
Surftec
Virtual Acorn

A theatre will be available for presentations from various companies including R-Comp who have an important announcement for us, John Cartmell *will* be telling of his plans for Acorn Publisher and the organisers are hoping Roy Heslop will presenting the portable which should be available at the show.

It is also hoped to have a demonstration of the Microdigitals' Omega somewhere at the show.

The show will be open from 10am until 4pm. Entry is £5 payable on the door.

The show Web site contains road maps, train timetables and everything else you need to know on finding the venue, or see the separate advert in this issue: **www.fillin.co.uk/seshow/**

For information about Guildford College and more maps, visit their site at **www.guildford.ac.uk**

More software development

R-Comp release more updates to their software portfolio this month. Several of their packages see newer versions being sent out to registered customers meaning R-Comp continue to be one of the most active software houses in the marketplace.

Messenger Pro 2.60a is the result of many smaller updates that have taken place during the development of Messenger Pro Server Edition (released earlier this year). The changes made during this time have resulted in a number of improvements for existing users of the standard Messenger Pro 2 product.

Of particular note, is much enhanced PGP support, especially for the new Gnu PGP software, which will be of significant interest to those using PGP security on their e-mails.

There have also been improvements to facilities such as distribution lists, which will now automatically split lists to avoid problems that many ISPs have with long lists.

The server version of Messenger Pro, announced last month, introduced a new database format which has allowed a number of other facilities to be included. Chief among these are message locking and the ability to share a folder's read/unread flags between different Messenger users, rather than each user seeing different unread/read. This is optional, of course, but can be very handy for a single person running several different user "identities".

Another package to see an upgrade is Grapevine, the RISC OS instant messaging client. Version 1.00 has many new features including:

- Support for MSN file transfer, so you can send and receive files - ideal for sending photos or sound clips etc
- Global clipboard support
- The ability to drop bits of text into the program to send it
- "joe bloggs is typing a message" and other status information
- improved top-bit-set character handling
- improvements to contacts system
- notification windows when friends log on
- support for systems running behind NAT firewalls and so on.

R-Comp have also updated the firmware on the RISC OS 10/100 Network cards. The new software resolves some minor performance issues when communicating with non-RISC OS machines, and also adds a number of new *Configure commands.

More details on all products can be found on the R-Comp Web site at **www.rcomp.co.uk**

Omega on tour

Riscstation laptop cancelled?

Fear not, the rumour that the Riscstation laptop project has been cancelled because of the death of Roy Heslop is, as most rumours, a somewhat distorted version of the truth. But perhaps the truth is even stranger than fiction:

Quite unknown to most people CTA Direct have been quietly supporting Astley & Tyldesley's Cycle Speedway team for the last two years.

As is the way of these things first of all Roy's children were brought into the team, and more recently Roy himself as a senior has appeared in the second Team.

In supporting his daughter (who is currently leading the Nothern League under 13's) Roy was actually testing his daughter's bike in front of his house (no protection, helmet or whatever) when a foreign object jammed in the front wheel. The bike stopped suddenly, Roy stopped too but a few yards further up the road, less one intact collar bone. Other injuries including abrasion and possible head trauma proved to be minor.

Roy wishes to thank the ambulance service and staff at Hope Hospital.

Some of the members of the team including from the middle right, Tomasz Wlodarczyk and Przemek Binkowski, both Polish national team members riding for the club for the summer. Both Tomasz & Przemek are looking to join the team again next year. Middle left Mike Hack, former England rider, Damien Hack former UK 13's champion. Bottom right Chris Heslop currently 4th Northern League U13's, Becky Heslop currently 1st Northern League U13's Our very own Roy can be found lurking in the background.

More info on A&T speedway team can be found at: **www.astleycyclespeedway.org.uk**

The Microdigital Omega is on tour round the UK user groups. By the time you read this, Microdigital will have demonstrated their flagship new computer in London, Wakefield and Scotland. According to their Web site, all customers who have placed advance orders and deposits should have now been contacted to confirm the detailed specifications of their required Omega.

RISC OS Promotional Brochure

RISC OS Ltd have produced a new promotional brochure for RISC OS which is aimed at potential licencees. It is available for download in a number of formats from the main RISCOS Ltd Web site.

www.riscos.com/brochure/index.htm

RISC OS Ltd points out that it is a generic brochure showing features that are available in different versions of RISC OS, not specifically those that are featured in RISC OS 4 or RISC OS Select.

RISCOS Ltd 3rd Annual Report

The RISCOS Ltd 3rd Annual Report covering the period 1st February 2001 to 31st January 2002 has now been released.

www.riscos.com/news/news_items/PR280802.htm

User group updates

The RISC OS User Group of London (ROUGOL) meets on Monday 21st October and Monday 18th November, from 7pm onwards, in the upstairs room of the Blue-Eyed Maid, 173 Borough High Street, London SE1 1HR (between London Bridge and Borough stations).

Admission is free and a wide range of snacks, meals and drinks will be on sale. For more information call 07876 035 495, visit http://rougol.jellybaby.net/ or e-mail info@rougol.jellybaby.net

The RISC OS North West User Group (RONWUG) meets on Wednesday 16th October and Wednesday 20th November, from 7pm onwards, at Trafford Metrovick Rugby & Cricket Club, Finnybank Road, Sale, M33 6LR.Ê Admission is free and light refreshments will be available.Ê For more information call 0161 9699820, visit www.ronwug.org or e-mail info@ronwug.org

The ICENI Computer Club meets on Wednesday 2nd October and Wednesday 6th November, from 7pm onwards, at Bourne Vale Social Club, Halifax Road, Ipswich IP2 8RE.Ê The October meeting will feature a talk by Paul Middleton of RISCOS Ltd (N.B. different date from that in the Foundation newsletter), and the November meeting is a presentation on Ovation Pro.

Admission is free for your first visit.Ê For more information call 01483 728 881, visit www.archipel.demon.co.uk/ICENI/ or e-mail peter.l.dunn@btinternet.com

The Essex group next meets at 7:45pm on Tuesday 8th October 2002. This meeting will be a special one, to celebrate the group's 20th Anniversary.

Thanks to some other groups rightly or wrongly claiming to be "the oldest Acorn club", EAUG have delved into the personal diary of their first Chairman when the club was called NAMEBUG. Fortunately, he was still accessible and was able to confirm some relevant dates. In 1982, their first committee meeting was on the 4th October and the first full meeting on the 3rd November.

Formation of the group was early in September, just before the end of the school holidays (for Essex). If it had not been for those other groups forcing them to do a little research, they might just have missed their own anniversary.

The programme for their anniversary celebratory meeting will be different and will be held in the spacious, if rural, setting of the Woodham Walter Village Hall, where they held their July meeting with Paul Middleton.

Their meetings are now normally 7:30pm for 7:45pm, but please watch c.s.a.announce or their Web site for further details www.wattys.fsnet.co.uk/eaug/ or e-mail Frank Watkinson eaug@aaug.net for more details.

Unix porting project

Peter Naulls has announced a new initiative for widening the scope of development software and other utilities available under RISC OS.

The Unix porting project is subscription-based service offering a way to actively contribute to RISCÊOS by having a say in what programs you want to see ported to the platform, and getting support, development and automated upgrades of the programs that are ported under the scheme.

Members pay an all-inclusive subscription fee, and with that you get e-mail support for all the programs available from the project. You also get to make suggestions and comments on what programs you'd like to see converted (or "ported") to RISC OS.

This scheme is not specifically aimed at programmers, nor advanced RISC OS users, but rather everyone who would like to see new software.

The cost is £25 per person for six months. This gets you e-mail-based support for one person for all the programs on their Web site on as many computers as you like.

Peter points out that this is not a shareware scheme, all programs have full functionality, and no charge is made for using them. The programs themselves are not for sale (they are free) it is the support and development you are paying for.

The following software is either immediately ready or very nearly so. Most, if not all, of these programs will be available for download when the project starts.

ssh (OpenSSH and SSH2 versions), BitchX, Links, Lynx, W3M, nano, less, file, wget, Tetrinet, ncftp, whois Rexx, m4

The following software requires more development. In some cases, they are speculative ports, in other cases they simply require work. No promises are made that they will appear, only they are being strongly considered.

sftp, scp, sshd, other ssh tools, Mutt, Emacs, bash, tads, nethack, lftp

Additions to these lists will either come from suggestions from subscribers, or programs that Peter chooses himself.

The project supports operation of the programs on all released versions of RISC OS from 3.5 to Select, although it is generally recommended you have at least RISC OS 4. Programs may work on RISC OS 3.1, but this is entirely at your own risk and no support is offered regarding operation of programs under it. You will also require an up-to-date boot sequence. It is also plausible in future that some programs will only work on RISC OS Select.

The software is available for download, and on CD. Because the subscription payment is for support and development participation, downloads are available to non-subscribers also but don't expect any support.

CDs are also available to both subscribers and non-subscribers. CDs cost £10 for the first CD, and £5 for any CD you order at a later date.

Subscription payment is either by way of cheque (UK only) or Paypal.

Cheques should be send to: Unix Ports, 45 Water Street, Cambridge, CB4 1NZ. And made payable to "Peter Naulls". Please write your name and e-mail address on the reverse side. For CD orders, please ensure you include a mailing address.

For overseas subscribers, or if you find it easier, you may use PayPal. E-mail Peter at the address below who will arrange payment in the correct currency.

Once payment is received, you will be sent a subscriber number via e-mail. This number is to keep track of subscription details, and does not normally need to be quoted. All queries about all aspects of this project should be sent to unix@chocky.org

Need access to a PC but don't have space for a new monitor, keyboard and mouse?



STEP 1 - Specify a PC base unit if you don't have one already

We can supply off-the shelf or custom PC base units to your requirements.

eg:
- Duron 1.1GHZ CPU. 128MB memory. 40GB hard drive. CD drive. 8-64MB graphics £499inc VAT and Delivery
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All machines come with internal modem, our Multimedia Keyboard, Wheel mouse and Loudspeakers.

- Windows ME or XP. add £80inc VAT. MS Works. add £20inc VAT.

STEP 2 - Add our Keyboard Controlled Switch

This miniature switch allows keyboard, monitor and mouse to be shared between two machines.
Modified for RISC OS macines, rated to 1920x1440 display, complete with all cables.

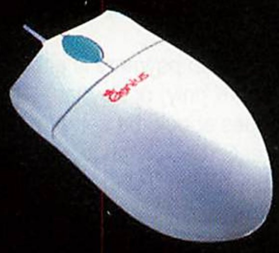
- Supplied as a pack including our PS2MouseMini interface : £99.95inc VAT (Was £113.90)
- Above pack when purchased with PC base unit: £90inc VAT (was £100)
- Keyboard Controlled switch alone: £89.95inc VAT (was £99.95)
- PS2MouseMini Interface (allows PC mice to be used on RISC OS machines): £18.95

(not to scale - it's about the size of two kitchen machboxes!)

STEP 3 - Attach to your existing RISCPC/A7000 and monitor

Add a networking pack if required.......
... and switch between the two with a couple of keypresses.

Mices! MMK! USB!



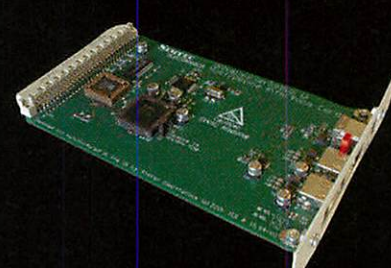
- STD Standard Mouse £19.95inc (Acorn mouse port, PS2Mini not req.)
- 3 button PS/2 mouse £5.95inc
- Genius Wheel mouse £12.95inc
- Genius OPTICAL mouse £17.95inc

Non-A7000 machines require our PS2MouseMini interface £18.95inc.



- Multimedia Keyboard
- For RISC PC / A7000 etc
- 19 Multimedia keys
- Complete with Drivers
- Click/non click versions

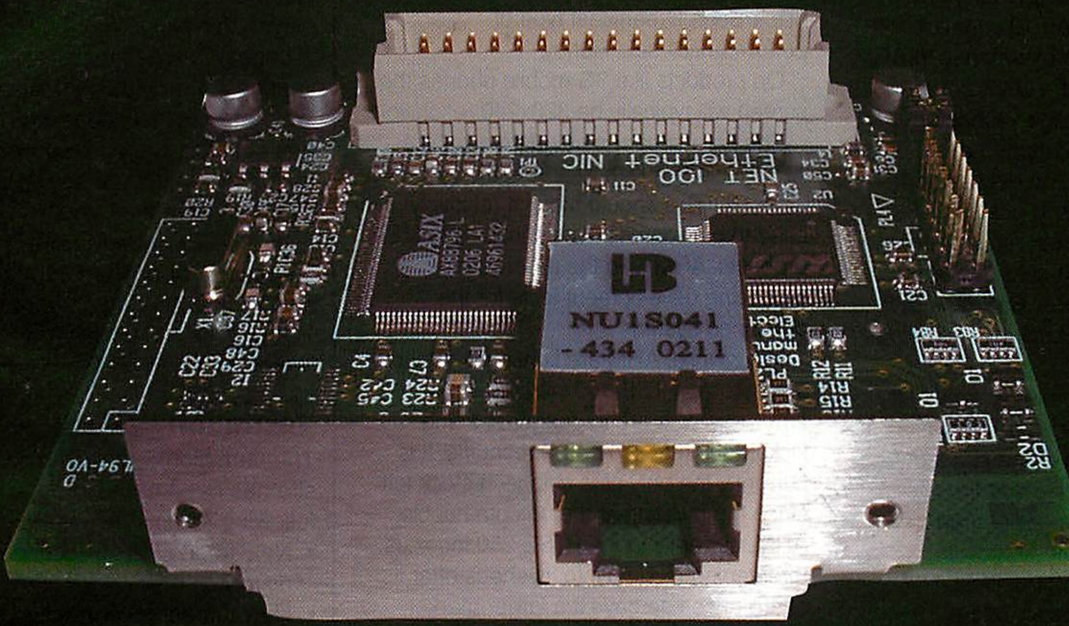
£24.95 inc VAT (was £34.95)



- Simtec USB Card.
- Supplied with keyboard mouse and joystick drivers.
- Drivers for other devices Available.

£79+del+VAT = £99inc

Long Long ago, in a place not *far from here*, there was a *dream* of a new standard. The *new standard* would allow RISC *OS machines* to be integrated *into fast* networks. It would *enable fast* file transfers. It *would reduce* latency and *congestion* on busy networks. *Now that dream is reality.* *That reality is......*



NET100

- 10/100BaseT Network Interface Card for RiscPC/A7000
- Provision for access to 10 or 100 Megabit networks
- Several hundred Kilobytes of FLASH memory for drivers
- Provision to allow users to change flash contents
- Lower latency than conventional 10megabit cards
- Includes BOOTP client software
- High integration brings affordable networking

Only £69+delivery+VAT = £89inc
Pack to link RISC OS to PC (NET100, PC Net card, Crossover cable) = £110inc
Pack to link 2x RISCPC or A7000 (NET100x2, Crossover cable) = £185inc
High performance network switches: 5 port = £45inc; 8 port = £75inc
LanMan98 £35. Cables and other networking devices available.

This Month: NET100; USB card; VirtualAcorn with PC's; Monitor, keyboard and mouse sharers; Multimedia Keyboards; Genius Mice

Remember - all calls to our 0845 number are charged at local rate.....

STD
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http://www.stdevel.co.uk

Phone, Fax or email for a free product information flyer!

All prices include VAT and P&P
Delta/Visa/Mastercard welcomed.

New board for ARM

ARM Ltd have announced that Mike Inglis, their executive vice president, Marketing, has been appointed to the Board of ARM Holdings plc, effective immediately.

"As ARM continues to invest in people who will drive the future growth in our business, I am very pleased to welcome Mike to the Board," said Warren East, CEO, ARM. "With his knowledge and understanding of our industry, and experience with two of ARM's long-standing Partners, he is already making a valuable contribution to our marketing activities."

Inglis brings more than 18 years of semiconductor industry experience to ARM and most recently led the UK Communications and High Technology team at A.T. Kearney management consultants. Previously, he held senior operational and marketing posts at Motorola including division manager of the company's global smart card business and European Microprocessor Business Unit manager, with responsibility for embedded processors.

Inglis has also worked in research, support, sales and design at Texas Instruments, as well as managing a merger integration when Motorola acquired its wafer fabrication plant in Edinburgh.

At the same time, Pete Magowan, executive vice president, Business Development and a director of the company, has stepped down from the Board and plans to leave the company shortly to work with technology start-up companies. Also, Pete Magowan has been appointed non-executive director of ARM 3D software Partner, Superscape with whom ARM has worked closely over the past 12 months in developing the ARM" core-based Swerve software platform.

"ARM is a great company with a world class team, which I feel privileged to have been part of," said Pete Magowan. "I've learned a great deal from working with its high calibre people, world-leading products and strong Partner relationships, and I look forward to using this experience to help create more companies like ARM and to emulate the success that I am confident the company will continue to enjoy."

"Pete Magowan has made a huge contribution to the development of ARM and we look forward to working closely with him in his new role at Superscape and with his other technology ventures in the future," added East.

ARM seem to be actively pursuing interests in the 3D graphics arena, with several alliances and partnerships recently announced. One such announcement was a joint venture with Imagination Technologies for their PowerVR MBC core.

"Our objective with Imagination is to create a standardised graphics platform for a number of different markets," said Noel Hurley, manager for consumer entertainment at ARM. The firm expects the ARM/MBX combination to slot into 3G mobile phones, in-car systems and even set-top boxes.

MBX varies in size between about 300,000 and 600,000 gates, with mobile at the low end and set-top box at the other. The former can render some one million triangles per second, the latter 2.5 million. "It's a Sega Dreamcast type of performance," said Hurley.

On products like 3G mobile phones the screen will typically be 320x240 resolution.

The core supports standard graphics APIs, including DirectX 7 and 8, along with OpenGL. This should make it relatively easy to port games from consoles to MBX products. ARM is in the process of producing development tools for the combined system.

Meanwhile, ARM are fighting it out for a place in the FTSE 100 with the software firm Sage who are in danger of being kicked out in next month's reshuffle. It is currently the only blue chip tech stock left since the bursting of the dotcom bubble. ARM, currently in the FTSE 250 index, is threatening to jump into its shoes after its share price rise gave it a larger market value of £1.88bn

ARM shares have had a recent surge amid signs that the semiconductor sector is pulling out of last year's record downturn, although still remain depressed at 150p along with the rest of the market at press time.

Pace Microcomputer shares were trading at 26p, which is just above the record low of 19p at the end of July. This is almost an incredible 1/100th of the highest traded price of 1245p in March 2000.

Subversion port

Alex Waugh has announced a port of the programmers' tool, Subversion. The goal of the Subversion project is to build a version control system that is a compelling replacement for CVS in the open source community. The software is released under an Apache/BSD-style open source licence.

For more information about Subversion, see **http://subversion.tigris.org/**

The RISC OS Subversion is currently an Alpha release, so some features may not be fully implemented, or may contain bugs. This port can only access repositories via http, and not (currently) local repositories.

Bible test game

A brand new RISC OS game has just been released: Logonosis at **www.logosword.co.uk/logonosis.shtml** It is a Bible knowledge & Bible trivia quiz for RISC OS and available for free download.

Logonosis is a game for one to four players. The questions include the easy and the challenging. The aim of the game is for each player to attempt to reach the centre by climbing inwards from the outer squares to the inner squares. Once the last five squares have been taken by any player, this player has won.

LogosWord has also been upgraded to version 4.4 providing additional applets, Bible browser functions and bug fixes, and sets the stage for some new Bible resources which will shortly be made available from the LogosWord Web site.

Visit **www.logosword.co.uk** to download Logonosis, or any of the other programs available on the LogosWord Web site.

Vermilion update

The Vermilion Sands Photodesk resource site has been updated again with the following items

- New tutorial on correcting barrel distortion
- New tutorial on correcting camera vignetting
- A new section intriguingly titled "LWA"
- Some new seamless tiles, including human skin
- Update on the unsharp masking tutorial
- Some more information on nacreous clouds
- New tutorial on basic image sharpening
- New tutorial on 'real' unsharp masking (high-quality image enhancement)
- Graphics news of interest to Photodesk users (and others)

The tutorials use example pictures of the Moon taken with a digital camera, and show how to enhance them. The section on 'real' unsharp masking explains how to use Photodesk's basic image manipulation features to create this powerful technique, which can give much better results than the program's built-in unsharp mask facility.

Visit the site at **www.photodesk.iconbar.com**

Spurned .ORG Bidders Slam ICANN

Ten organisations that were overlooked in an evaluation to decide the next manager of the $15m-a-year .org internet domain have criticised the selection process, calling it inconsistent, opaque and unfair. One bidder even hinted at a legal challenge the process, which was orchestrated by the Internet Corp for Assigned Names and Numbers (ICANN).

The criticism follows an ICANN-published preliminary report on the bid evaluations, recommending an application by the Internet Society. The recommendation was based on separate technical evaluations from Gartner Inc and an informal committee of academic CIOs, and a policy-oriented evaluation from ICANN's non-commercial domain name holders' constituency.

ISOC, which is backed by Ireland-incorporated registry infrastructure provider Afilias Ltd, was selected as because it was the only proposal selected as above average in all three evaluations. Two other bids, from NeuStar Inc and Global Name Registry Ltd, were picked as runners-up, and both came out strongly against the ISOC recommendation.

"The Preliminary Staff Report brings into question the transparency and accountability of this process as implemented," NeuStar said. "At a minimum, it is based on flawed evaluation reports, applies inconsistent weighting to the evaluation reports [and] inappropriately and prematurely selects ISOC."

"We have found issues with each of the evaluations," GNR's Karen Elizaga said. She said the NCDNHC report in particular, in which ISOC but not GNR was deemed above average, was flawed. It contains mathematical errors, creates criteria not in ICANN's request for proposals, and ignores parts of some proposal but not others, she said.

"I think it is predictable that 10 of the 11 that applied to run .org that were not selected for the preliminary run would be critical of the one selected," ICANN spokesperson Mary Hewitt said. "We will look at their comments and take them into consideration." The final decision will be made by the ICANN board of directors before the end of the month, following a second analysis document.

NeuStar's comments even go so far as to contain what appears to be a thinly veiled threat to ICANN, which is currently undergoing a crucial reform that, should it fail, would call its ongoing existence into question. NeuStar did not return requests for comment on the contents of its document.

"ICANN is at a critical point in its existence. The organization is under attack at all levels from both national and international sources," NeuStar said. "A challenge of the final decision of ICANN in the .org selection process will bring undue scrutiny on ICANN. The preliminary recommendations of the Staff Report will not withstand such scrutiny and will bring into question the organization's reform efforts as a whole."

Quite apart from taking swipes at ISOC and ICANN's processes, the spurned applicants have also started arguing amongst themselves. GNR's Elizaga pointed out that Gartner compiled an analysis report on NeuStar (ranked higher than GNR in the Gartner report) around the same time as the evaluation was taking place.

"I've no doubt Gartner intended to be objective," she told ComputerWire, "but their extra knowledge of NeuStar's systems could have swayed their analysis."

Other applicants pointed out that Register.com Inc and VeriSign Inc, behind two other bids, also have had business dealings with Gartner.

The financial stability of the various bidders has also been called into question. NeuStar and GNR both question the wisdom of awarding .org to ISOC, which has faced severe cash flow problems recently. But ISOC said it intends to create a new entity, PIR, which will be financially independent of ISOC.

Rumours and reports also question GNR and NeuStar's financial condition. NeuStar has reportedly been laying off many staff over the last year and is making a loss, while GNR has been rumored to be for sale itself, possibly to VeriSign, for some time.

Other industry news

Solar surgery carves chicken breast

Israeli scientists say they've carried out successful trials of "solar surgery" technology on a chicken breast. The system uses a curved plate-sized dish to concentrate sunlight and bounce it into a fibre-optic cable. Scientists say cables on hospital roofs could carry the beam to operating theatres, where it could be used instead of lasers to burn away tumors. The team admits that solar surgery probably couldn't be used for emergency treatments (especially in the UK) in case cloud cover shuts down the beam.

Car with feelings

A car that smiles, frowns and has a "relationship" with its owner is being launched by Toyota. The Pod car detects and reacts to the feelings of its driver through special sensors. The car can tell the driver's mood by checking his pulse or by how much he is sweating.

The color trim of the four-seat, 1.5-liter engine is designed to light up a happy orange-yellow when its owner approaches. If you swerve or brake too harshly, the color changes to an angry red. If you get a flat tire, run out of gas, or bump something, it goes blue and cries. Toyota developed the Pod with Sony.

Microsoft security risks

An increasingly common report, but Microsoft said that "critical" security lapses in its Office software and Internet Explorer Web browser put tens of millions of users at risk of having their files read and altered by online attackers. An attacker, using e-mail or a Web page, could use Internet-related parts of Office to run programs, alter data, and wipe out the hard drive. The attacker could also view file and clipboard contents on a user's system. Microsoft is offering a patch at its Web site that eliminates these vulnerabilities.

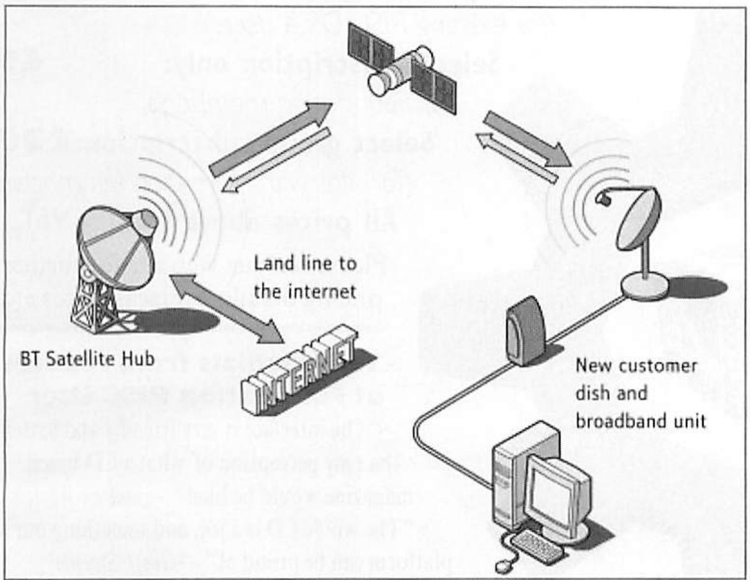
Robot threat to slugs

Scientists at Britain's University of West England have developed the "SlugBot," a prototype robot capable of hunting down more than 100 slugs an hour. The 2-foot-high machine operates after dark when slugs are most active. It uses an image sensor that beams out red light to pinpoint the slugs. It then uses a carbon-fibre arm with a three-fingered claw grabber to pick up the slugs and store them in a tank. The University said that the SlugBot was only a proof of concept machine.

Access all areas

High speed broadband Internet access via satellite is now available from BTopenworld across the whole of the UK. The service is priced for business use but offers only similar transmission speeds to the BT ADSL Home 500 product, namely up to 500Kbps download and 153Kbps upstream bit rates.

As well as the potential speed reduction by contention of the system by other users, satellite broadband bit rates can be affected by what we might term "the wrong kind of rain", as some Sky TV subscribers will have discovered in this year's torrential summer, when normal signal strength and quality levels plummet as the sultry summer clouds burst onto your rooftop.



Your dish can be damaged by blue arrows

The BTopenworld Business Satellite Service uses a slightly larger dish than for TV, and it provides two-way communication to the Eurobird satellite. As for Astra, a clear and unobstructed view to the south is required for the dish which will be mounted on or near your business premises, and for transmission and reception requires two co-axial cable runs. The Eurobird satellite is at 28.5 degrees East in a geo-synchronous orbit over the equator.

BT estimate that it takes about three hours to install the dish, which requires higher precision in alignment than for TV, and planning permission may be required even if there's a Sky dish in place already. For the single computer service, a Gilat SkyBlaster 360ª satellite terminal (don't you just love that model name) is supplied, and BT emphasise that Internet connection sharing cannot be used. Hmm.

Their Satellite 500/4 service does have a single Ethernet connection modem, the SkyStar Advantage 180 VSAT terminal but you have to provide your own hub to expand to multiple PC access. BT provide you with five usable RIPE (ie global not private nor NAT) IP addresses on this system, so that with one address for the VSAT terminal, you have four left for your PCs. I can't see why you couldn't use an additional NAT router locally to connect multiple computers while using just one of these addresses on its WAN side.

Shame about the pings

BT admit that using the Business Satellite broadband system for running servers is impractical due to round-trip delays, and as far as online gaming is concerned, unless 700 - 800ms pings are acceptable (unlikely) you can forget it. Also if you happen to be online doing something vital at the precise moment that the sun passes behind the satellite at 11:30am on the March and October equinoxes, your dish will probably be blinded for a few minutes.

[Various picture references=dish, dish2, dish3, sb360, rdskystar]

[Use wherever? (From Gilat web site)]

BT's first 1000 new single-user business customers ordering before 30th September will save £250 on the standard equipment and installation charge of £899+VAT, while paying the standard monthly line rental of £59.99+VAT. BT calculate that business users who use the Internet for more than three hours per day and who currently use an ISDN connection could save up to £2300 a year. Where ADSL is unavailable or impossible technically, the satellite broadband service seems to provide the solution.

BTopenworld Business Satellite
www.btopenworld.com/satellite/index.html

David Dade
comms@acornuser.com

In brief

Instant Natter

Arpie, also known as Russell Palmer has released Natter, the RISC OS multi-protocol instant messenger. The program boasts operation with both ICQ and MSN Messenger, which are a couple of the most popular instant Internet chat services. From Arpie's eye-catching Web site you can download the shareware natter program and register for £10 by cheque or in any other currency.

Registered users get extra options on the Web site, and receive a version free of the irritating registration reminders as well as updates and access to the natter mailing list. Russell has just graduated so suggests checking the Web site for the latest contact address. He's always ready for a natter by e-mail though so try russell@arpie.co.uk or arpie@natter.iconbar.com

Natter by Russell Palmer
http://natter.iconbar.com/

Oops!

In last month's feature on Jochen Lueg's entertaining Web site I omitted the all-important URL for his site, which while not at all obvious, is indeed the first result returned in a Google UK search for his name. As it happens, Jochen has just released another interfacing project and companion demonstration program called TapeCon which allows you to control an electrically-suitable cassette deck from the computer.

All Jochen's interfacing programs can now use the Printer port if a hardware User Port isn't detected. The site also explains how to make suitable leads for all the projects. I wish Jochen would write an interfacing program to proof-read Acorn User articles.

Jochen Lueg's Web site
www.argonet.co.uk/users/tudor

We Three ISPs

That outspoken organ "The Register", the Internet "Red Top" whose witty slogan "Biting the hand that feeds IT" adorns its news page, has announced that by the time you read this, it will have launched its very own UK virtual ISP "Vulture Capitalist ISP", or vcisp.net for short. The Reg will offer top-quality Internet access products at competitive prices including self-install ADSL.

Check www.theregister.co.uk for details. Other low cost ADSL ISPs are popping up, including fairADSL based in Canary Wharf, London, offering ADSL with dynamic IP for £18.99 per month; setup fee £58 (www.fairadsl.co.uk/index.htm), and ET Global Solutions (www.etglobalsolutions.com) with six options including Instant User Home 500 at £18.95 (inc VAT) per month; £60 setup.

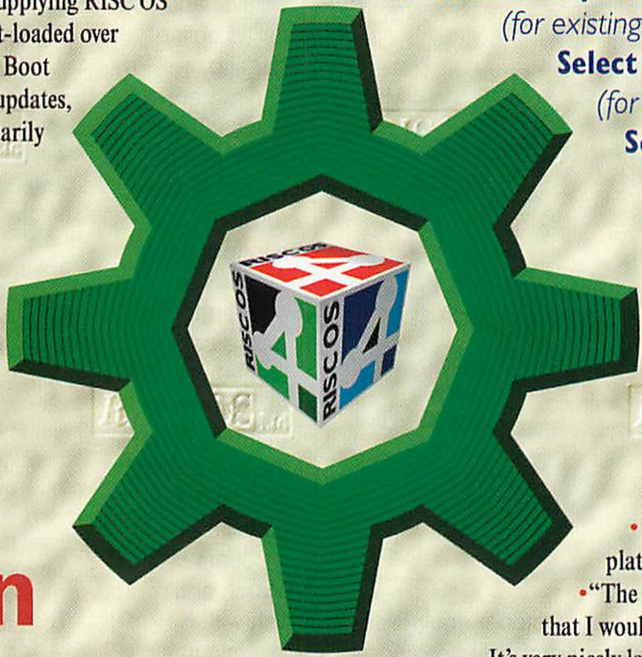
RISC OS SELECT

Make the right choice for the future with

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Keep up to date with every new version of RISC OS as it appears!

The **RISC OS Select** scheme is the new way of supplying RISC OS upgrades. It provides a ROM image which is soft-loaded over the internal RISC OS 4 ROM, along with a new Boot sequence and applications. Distribution of the updates, and technical support information, will be primarily via the Select Web site, with periodic releases on CD. Payment for the scheme is made by annual subscription. All you need is a machine with RISC OS 4 already in ROM on which to install the **RISC OS Select** versions of RISC OS 4.



What does the Select scheme provide?

By joining **Select** you will receive the following benefits:

1. Periodic updates via the **Select** private Web site.
2. Up to three CDs per year, containing the latest version of RISC OS plus optional beta-test copies of software components in development. Every CD will be bootable and contain a full, working disc image that allows the easy selection of different boot sequences.
3. The right to upgrade up to **ten** RISC OS computers at one site. **Select** is a personal scheme: you only need one subscription even if you own several machines. However, RISC OS 4 is needed for each one: **Select** cannot be used with RISC OS 3·7 or earlier.
4. **Affiliate Registered Developer** status: if you are a programmer, joining **Select** entitles you to become an Affiliate Developer for no extra charge, and have your products included in the Database section of **Foundation RISC User** magazine and on the Web site.

RISC OS 4 upgrades and Select scheme prices

Subscriptions to **Select** are available on an annual basis, and may be purchased in combination with a RISC OS 4 upgrade.

RISC OS 4 upgrade plus Select subscription:	**£179**
RISC OS 4 upgrade only *(new low price!)*:	**£109**
Select subscription only: *(for existing RISC OS 4 users)*	**£105**
Select subscription only: *(for Foundation members)*	**£99**
Select group subscription: *(for sites with more than ten machines)*	**£300**

All prices above include VAT.

Please see our Web site for further pricing details, overseas prices etc.

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Testimonials from readers of Foundation RISC User

- "The interface is very friendly and better than my perception of what a CD-based magazine would be like!"—*Andrew Weston*
- "The whole CD is a joy, and something our platform can be proud of."—*Geoff Steeper*
- "The Foundation CD has contradicted my opinion that I wouldn't be able to read a CD magazine happily. It's very nicely laid out."—*Fred Bambrough*
- "Congratulations on Foundation RISC User… it works smoothly, looks good and has masses of useful and interesting content."—*Gavin Wraith*
- "Keep up the excellent work! (And what I REALLY appreciate is someone who can write, spell, talk sense, and knows his its-es and it's-es!)"—*Jeremy Roberts*
- "It's a really excellent job."—*David Pilling*

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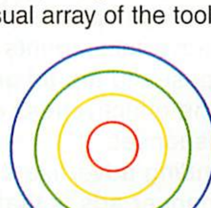
From 31st May, prices will increase as follows:
UK: **£33**+VAT (£38·78); EC: **£35**+VAT (£41·13);
Non-EC countries in Europe: **£35** (no VAT);
Postal Zone 1: **£37** (no VAT); Zone 2: **£39** (no VAT)

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sales@riscos.com

Before and After the Revolution

When I started in the graphic design business, almost everything was done by hand. I had the usual array of the tools of the



trade: a range of precision mapping pens, countless drawing templates, compasses, rulers, set squares, type-fitting rulers and, very important, piles and piles of sheets of Letraset and similar headline-creating products.



Mundane tasks were very difficult: concentric circles, for example, were very fiddly and easy to get wrong. Even straight lines could go wrong, and if they did you'd have to start again or painstakingly scrape the mistake off with a razor blade. Happy days? Mmm.

Graphics was one of those professions



which was turned it on its head with the development of the personal computer. 'Desktop publishing' came into being while several long-established techniques became obsolete overnight. Collections of Letraset lettering sheets amassed over years were given away or thrown out.

Creating headlines on a computer became a joy; creating artwork on the computer was a joy. These concentric circles which caused me so much grief became a matter of creating circles in Draw and aligning them with a couple of mouse clicks. Centring text or elements of design needn't be a task any more: the computer did the calculations in a split second. The real boon was that all the artwork could be created on the screen



before it was ever printed out.

Of course, there was some initial resistance. While the computer freed us from mundane aspects of drawing, it necessitated investment in hardware and software, and thus began an endless round of buying, upgrading, assessing, wishing. My choice of platform, Acorn as it was then, had at that time many advantages in cost and quality of software.

Also, there were times when I wanted to produce something on the computer which I could do quickly by hand, but I couldn't figure out the way, and how I managed to avoid throwing my Archimedes out the window I don't know. With increased proficiency came greater tolerance however and, like most others in the profession, I eventually embraced the new methods of working.

This revolution also meant that design was within reach of everyone with access to a computer. Posters, signs, fliers and leaflets began appearing and it was



obvious that they'd been done at home. My early worry about this was relieved by an important realisation: although the software can help greatly with creating artwork, the computer is only another tool. It can't give you design skills if they're not already there. The computer can't, for example, give you artistic ability, which is why 'clip art' became so popular. Need a picture of a coffee mug? Delve into your clip art collection.

Here's an irony. I have used the computer to create hundreds of illustrations in many styles. Some of these styles aim to produce illustrations which look like they're hand-drawn or woodcut prints. Using computer software to generate art which looked decidedly non-computer generated does seem bizarre, but it had advantages. Vector graphics in Drawfile format is a perfect, flexible medium. Illustrations in digital formats can be manipulated easily, effortlessly resized, the colours changed, flipped, reversed, stretched and squashed.

There are things which are still better done by hand. Celtic knotwork, for example, is very tricky in Draw or Artworks because of its interlocking nature. There is no way in vector



illustration programs to have one shape alternately going over and under other shapes. The solution is to use an intricate system of smaller shapes and mask the joins. Calligraphy is also best done by hand, although it is possible to manipulate text to look more like hand-drawn letters.

Conversely, there are some things which are a breeze on the computer which would require a lot of work to emulate by hand. Graduated fills, for example (possible with Draw, and one of the stronger features of Artworks) would have given me huge difficulty by hand,



but on the screen it takes a couple of mouse clicks. And if you don't like the result, press F8 (Undo) and start again. I could have done with a magic button like that when I was spending hours at my drawing desk; if I didn't like it in those days I'd have to start from scratch again!

Computers certainly aren't the answer to everything in graphic design, but by absorbing much of the necessary humdrum procedures, they have freed us to concentrate on the more creative side. As one who has experienced graphics from before and after the revolution, I know this is a very good thing.

Nigel Gatherer
graphics@acornuser.com

In your face

On the Web, advertising is becoming more and more "in your face". There are now pop-up ads, ads that play music and sound tracks, even ads that swim across the screen, and so on.

Luckily (or unluckily depending on your viewpoint) RISC OS users don't get to see the more exotic versions but it's worth knowing what you can run in to, and why it's there.

In the beginning

When the Web first started being a "commercial endeavour" around 1997 or so, thousands of new sites were born and billions of dollars in venture capital flowed into them. The sites divided into two broad categories:

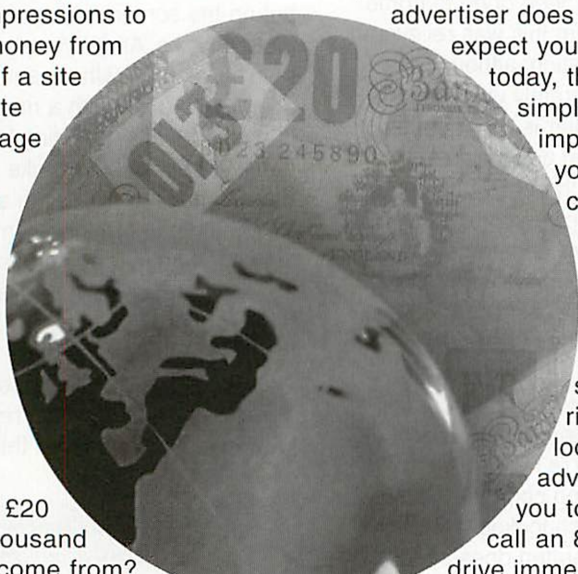
• E-commerce sites that make their money from the products they sell, just like a brick-and-mortar store does.

• Content sites create or collect content (words, pictures, video, and so on.) for readers to look at. Content Web sites make their money primarily from advertising, like TV stations, radio stations and newspapers.

In those halcyon days advertising on the Internet meant just "banner ads", the 468x60-pixel ads you see at the top of almost all Web pages today. In 1998 or so, banner advertising was a lucrative business. Popular sites like Yahoo could charge £20, £30, even £50 per thousand impressions running banner ads on their pages.

These advertising rates provided fuel for much of the venture capital boom at that time. The idea was that sites could start up and increase their page impressions to make easy money from banner ads. If a site could generate 100 million page impressions per month, it could make £2 million per month with banner ad rates at £20 per thousand impressions.

Where did numbers like £20 or £30 per thousand impressions come from?



That's what magazines typically charge for full-page colour ads. The Internet took the same payment model and applied it to banner ads.

At some point, advertisers came to the conclusion that banner ads were not as effective as full-page magazine ads or 30-second TV commercials. At the same time, there was an incredible glut of advertising space, thousands of sites had a million or more page impressions available per month, and companies like DoubleClick began collecting these sites into massive pools of banner-ad inventory.

The economic principle of "supply and demand" works the same way on the Web as it does everywhere else, so the rates paid for banner advertising began to plummet.

A company buys advertising for one of two reasons:

• Branding
• Direct sales

Branding refers to the process of impressing a company name or a product name onto society's collective consciousness. Let's say you have come up with a new brand of cola, or you are opening a new restaurant, or you are selling a new whatsit. You want to get the product's name (and sometimes the product's features and benefits) firmly planted in people's heads. This is branding.

Branding happens with both new and existing products. When you see a billboard that says nothing but "Coke" on it, or you see a feel-good ad on TV about a car company or an oil company but there's no mention of a product, that is branding. The advertiser does not necessarily expect you to do anything today, the advertiser simply wants to impress itself on your consciousness.

On the other hand, a direct sales ad is an ad that is trying to get you to do something today, right now, as you look at the ad. The advertiser wants you to click on the ad, call an 800 number or drive immediately to the shop. Or do some other active thing so that you buy something, download something or sign up for something today. The advertiser counts the direct responses to the ad and measures the effectiveness of the ad by those responses.

What branding advertisers came to feel about banner ads is that banner ads are not the most effective vehicle for branding. Relative to a magazine ad or a TV ad, banner ads are small and easily ignored.

What direct sales advertisers came to feel about banner ads is that the response rate for banner ads is low. For most banner ads, the industry average seems to hover between two and five clicks per 1,000 impressions of the ad (0.2%-0.5%). That is, if a banner ad appears on 1,000 Web pages, between two and five people will click on the ad to learn more.

Those five clicks per thousand impressions don't have much value to most advertisers. The reason is because those five clicks will not all generate sales. Out of 100 clicks, perhaps one person will actually do the desired thing.

Here's an example. Let's say that a publisher wants people to buy a book, and hopes to increase sales of the book through advertising. The publisher has budgeted £3.00 per copy of the book to spend on advertising. If the publisher is paying £30 per 1,000 impressions for banner ads and purchases 100,000 impressions for £3,000, here is what happens:

• The banner ad appears *100,000* times.

• Let's say the response rate is five clicks per 1,000 impressions, so 500 people click on the ad during the time the 100,000 total impressions are running.

• If two percent of those 500 people actually purchase the book, that results in 10 purchases.

• The publisher had to pay (£3,000/10) £300 for each book purchased through that ad.

Obviously, paying £300 to sell one book is not a good economic model for a publisher, especially since the budget is £3.00 per book. For this type of advertising to work for the publisher, the publisher would need to pay 30p per 1,000 impressions, rather than £30.

So banner ad rates began to decline. Today, if you shop around, you can buy banner ads from thousands of Web sites or brokers for 30p or so per thousand impressions, which is pretty much exactly what they are worth to a person who is trying to sell something with banner ads using a direct sales model.

It is possible for some Web sites to charge more than 30p per 1,000 impressions. For example, the top 100 or so Web sites can charge a premium because of their size. There is also a process called targeting. For example, if you want to sell a RISC OS computer, you might advertise on the Acorn User Web site and get a targeted audience for your ad, which will typically increase the click-through and response rate for the ad.

As was described in the September issue of Acorn User Google and many search engines target their banner ads to the search words people type in, and they charge more for these targeted ads. But for most other Web sites, there is very little money to be made from banner ads.

Sidebar ads

A sidebar ad (also known as a skyscraper ad) is similar to a banner ad, but it is vertical rather than horizontal. Because it is vertical, the height of a sidebar ad can often reach 600 pixels or more, and sidebars are generally 120 pixels wide. This has more impact than a banner ad for at least two reasons:

• A tall sidebar ad is two to three times larger than a banner ad.

• You cannot scroll a sidebar ad off the screen like you can a banner ad. With a banner ad, you can scroll just 60 pixels down and the ad is gone. With a sidebar ad, the ad is with you much longer.

Because of this increased impact, sidebar ads have higher branding power and a higher click-through rate. A typical sidebar ad has a click-through rate of 1 percent (10 clicks per 1,000 impressions), or about two to three times that of a banner ad. Advertisers will typically pay 70p to £1.00 per 1,000 impressions for sidebar ad placement. Advertisers pay more for targeted sidebar ads, just like they do with targeted banner ads.

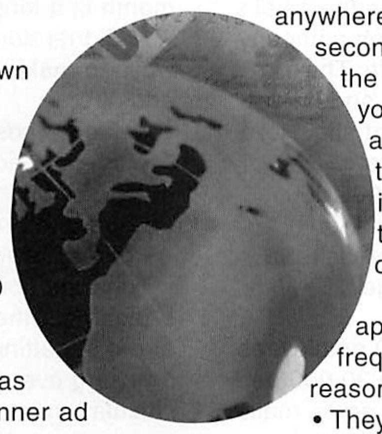
Pop-up and pop-under

A pop-up ad is an ad that "pops up" in its own window when you go to a page. It obscures the Web page that you are trying to read, so you have to close the window or move it out of the way. Pop-under ads are similar, but place themselves under the content you are trying to read and are therefore less intrusive.

Pop-up and pop-under ads annoy many users because they clutter up the desktop and take time to close. However, they are much more effective than banner ads. Whereas a banner ad might get two to five clicks per 1,000 impressions, a pop-up ad might average 30 clicks. Therefore, advertisers are willing to pay more for pop-up and pop-under ads. Typically, a pop-up ad will pay the Web site four to 10 times more than a banner ad. That is why you see so many pop-up ads on the Web today.

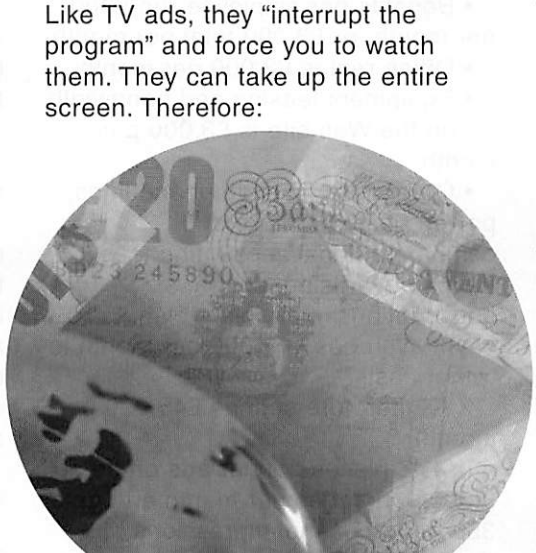
Floating Ads

These are ads that appear when you first go to a Web page, and they "float" or "fly" over the page for anywhere from five to 30 seconds. While they are on the screen, they obscure your view of the page you are trying to read, and they often block mouse input as well. An ad of this sort can be completely animated.



Floating ads are appearing more and more frequently for several reasons:

• They definitely get the viewer's attention. They are animated. Many now have sound. Like TV ads, they "interrupt the program" and force you to watch them. They can take up the entire screen. Therefore:



• From a branding standpoint, they are much more powerful than something like a banner ad or a sidebar ad. They cannot be ignored.

• They have a high click-through rate, averaging about 3 percent (meaning that 30 people will click through for every 1,000 impressions of a floating ad).

The high click-through rate, as well as the greater branding power, means that advertisers will pay a lot more for a floating ad, anywhere from £2 to £20 per 1,000 impressions depending on the advertiser and the ad. Because they can pay a lot of money, Web sites are willing to run floating ads.

The only problem with floating ads is that they annoy people. Some people become infuriated by them, and will send death threats and three-page-long rants via e-mail. That is why you do not yet see them everywhere.

The annoyance problem points out something interesting about advertising, however. When pop-up ads first appeared, they bothered lots of people and you did not see them on very many sites. After a while, people got used to them and stopped complaining, and now pop-up ads can be found on tons of sites.

Television provides another useful example. If all television channels were ad-free today, and suddenly a TV station were to start running eleven minutes of advertising every hour right in the middle of programs, people be very upset. There would, quite possibly, be riots in the streets. But since we are all familiar with TV ads, they don't bother us much. In fact, sometimes they are better TV than the programmes themselves. As people get used to floating ads, they will become more common.

Unicast ads

Definitely not a problem for RISC OS users as yet, partly because they are still uncommon and partly because of the technology used. A Unicast ad is basically a TV commercial that runs in a pop-up window. It is animated and it has sound. The ads can last anywhere from 10 to 30 seconds.

A Unicast ad has roughly the same branding power as a TV commercial. However, a Unicast ad offers something that TV ads cannot, the ability to click on the ad for more information. And people do click on them at an amazing rate, a 5-percent

click-through rate (50 clicks per 1,000 impressions of the ad) is not uncommon.

Because Unicast ads have branding power and because people click on them, £20 per 1,000 impressions is a common rate paid to Web sites right now. Because they pay so well, they are likely to spread rapidly.

Other variations

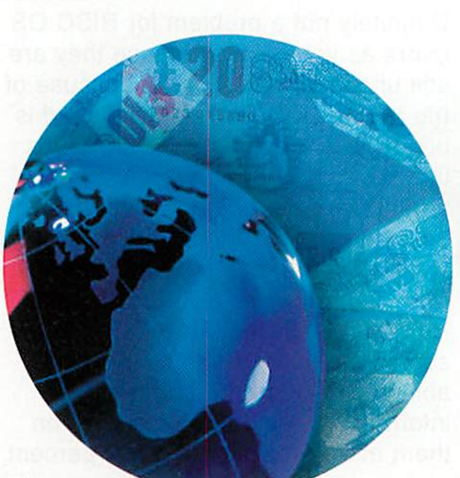
You are likely to see many other variations on the theme as time goes on. Here are several examples:

• Some content sites offer something called a "takeover campaign." Browsers visiting the site see a large ad when they first come to it and then they see the message reiterated throughout the site in banner and sidebar ads. The advertiser essentially "takes over" the site for one or more days.

The approach works very well as a branding ploy because the brand is visible to browsers throughout their entire visit to the site. Click-through rates are very high. Advertisers have been very pleased with the results, and negative reader reaction has been minimal because everyone is familiar with banner and sidebar advertising.

• CNN has been experimenting with streaming sidebar ads. A small video ad appears in the sidebar, with sound, and plays for 30 seconds. The reader can control the ad with the three buttons (Play, Pause, Stop) underneath the ad.

• Pull-down banner ads have appeared on some sites. Their operation varies depending on the site. On some, when you mouse over the banner ad, it expands to fill much of the page. On others, the banner ad is expanded-size initially, then shrinks to normal size after several seconds.



All of these different ad formats are trying to find combinations that give advertisers what they want, high click-through rates and branding power. In return, advertisers are willing to pay Web sites for running these ads because the ads work.

How bad can it get?

Any Web page could be set up to give you a barrage of advertising:

• Multiple banner and sidebar ads.
• Two pop-up ads
• Three pop-under ads.
• And a floating ad.

If there were a Unicast ad playing over the top of it all, that would be a worst-case scenario. It is hard to imagine a Web page having much more advertising than that.

The reason you see things like this is because it pays well. A Web site can, in theory, make between $40 and $50 per 1,000 impressions if every page were loaded with this much advertising. That is a lot of money. On the other hand, this much advertising tends to turn readers off.

So why do Web sites end up running so many ads like this? Let's create a hypothetical Web company and use it as an example. The company is called XYZ, and it is a small, successful content site. Here are some of its parameters:

• The company has 1,000,000 visitors a month who read, on average, eight pages per visit. So there are 8,000,000 page impressions per month.

• The company has 10 employees, with an average pay of £30,000 per year. Some make more, some make less. That means payroll is about £25,000 per month.

• Benefits per employee run £300 per month, or £3,000 total per month.

• Office rent is £3,000 per month.

• Equipment leasing and bandwidth to run the Web site is £3,000 per month.

• Other costs include phone lines, power, office furniture and computers, legal/accounting fees, travel, advertising, coffee, subscriptions, blah, blah, blah. Let's say it averages £12,000 per month in "other costs."

XYZ therefore spends £46,000 per month.

If XYZ places banner ads on its 8,000,000 pages per month and gets 35p per thousand impressions, it makes £2,800 per month. Obviously, that isn't going to cut it, £2,800 per month does not even cover one person, or the bandwidth and equipment.

If XYZ is able to sell floating ads or Unicast ads at £20 per 1,000 visitors (not page impressions, visitors), then the site's 1,000,000 visitors per month can generate £20,000 per month. That, plus the banner ads, gets the company to £22,800 per month. You can see that there is still a problem, XYZ is only halfway to breaking even.

Keep in mind that there is no guarantee that XYZ will be able to sell all of its ad space. It would take a very good sales person (or sales force) to find companies to sign contracts and pay for all of that inventory (8,000,000 banner ad impressions per month, 1,000,000 Unicast impressions per month). There is no guarantee, for example, that XYZ can find companies to pay £20 per 1,000 impressions for 1,000,000 floating ads or Unicast ads. If XYZ is able to sell all of its space, it is extremely lucky, so getting to £22,800 per month every month is a long shot.

XYZ therefore needs to find other ways to make money. If XYZ now adds in:

• sidebar ads
• 250x250 ads in the middle of articles
• pop-under ads
• one or two other ad features

Then the company might be able to bring in another £10,000 per month, and it is getting close to its goal of breaking even. That kind of calculation is exactly why you see so many ads on Web sites today. It's either:

• Lots of ads
• Switch over to subscriptions (and hope that you can get 50,000 people to subscribe, no easy task)
• Go out of business

A Web site is a business, and it must cover its expenses to survive.

That, of course, is looking at a content-only company, they don't sell things. But they might. So what about changing the parameters again, what about affiliates? What about companies like Amazon.com? What other ways are there to make money out of your Web site?

We will take a further look in the next issue.

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Digital ants

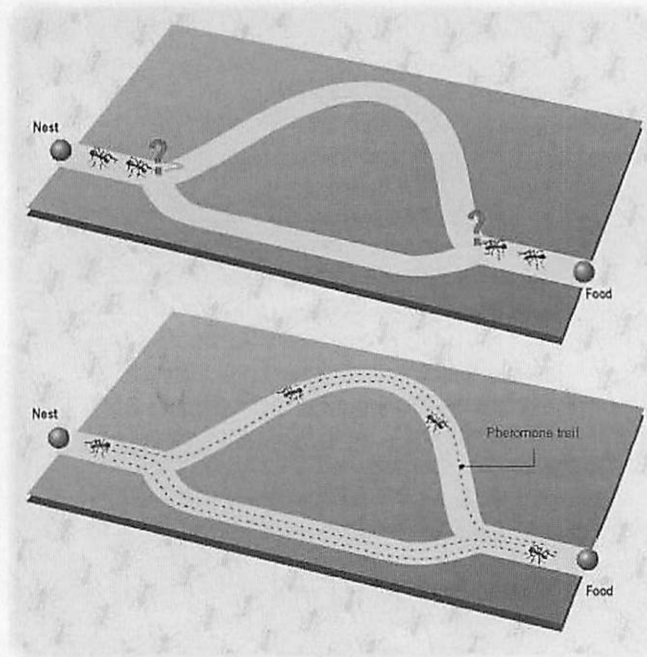
Modeling of natural phenomena has come a long way since the 1940s when the cellular machine was created by John von Newman and Arthur Bracks. We now have neural nets imitating brainwork, genetic algorithms applying the evolution principles, emulations of the behaviour of a flock of birds or school of fish...

One of the current trends is Swarm Intelligence. One of the advantages of this technique is that programs created with this approach have already passed the theoretical stage and are benefiting in many spheres. AT&T and British Telecom are already applying software techniques using these principles for traffic routing; General Motors are launching their spares conveyor control system using swarm logic. These are the major corporations using it, but with the addition of small start-up companies, the examples of swarm intelligence algorithm application can be found in great numbers.

What's it all about?

The founders of the present developments are Eric Bonabeau, Marco Dorigo and Guy Theraulaz. Their discovery was that a system consisting of many agents operating according to simple rules can sometimes solve big and complex problems. There appeared a new method of complicated system building where the system is not built with some fixed predetermined structure and all its components submit to the "headquarters".

The systems built on the basis of Swarm Intelligence are empiric: their actions cannot easily be explained mathematically, but in practice can produce impressive results. This is the strength and at the same time the weakness of the approach. They can be better than the fixed systems based on a mathematical approach for precise well-structured tasks but there is no clear way of deciding whether it's going to work.

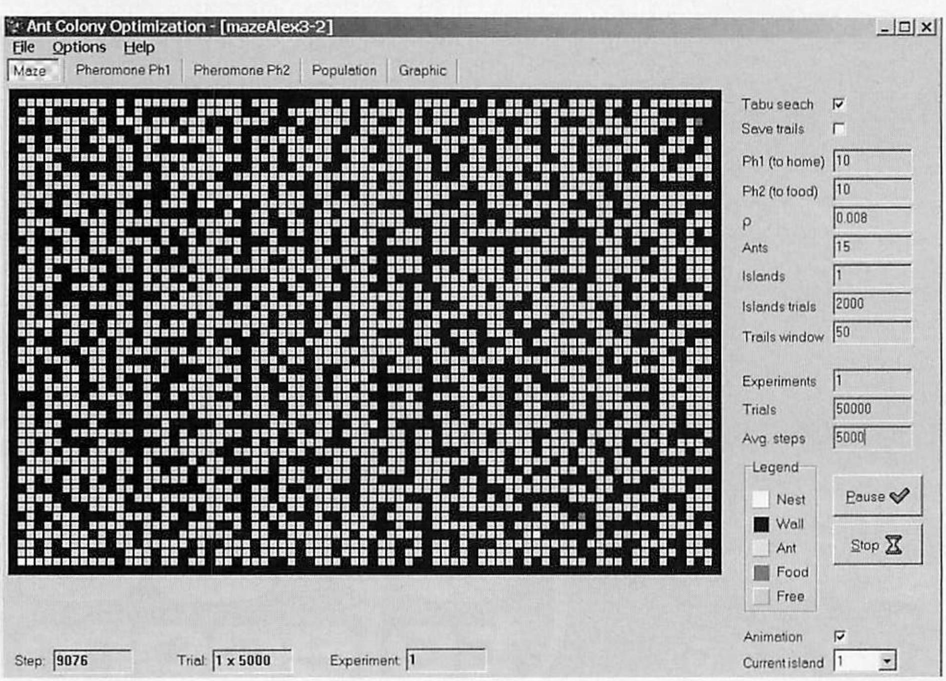


It is their capability of self-organizing can be of great use. It is possible to try and make a model of all existing systems consisting of many independent objects, be it the financial markets or the population of gorillas in the Serengeti sanctuary.

The popularity of Swarm Intelligence lies in its exceptional simplicity. The first, most well-studied and frequently applied peculiarity of the ants is their ability to find the shortest way to food sources. Two thirds of the works dedicated to the swarm intelligence are carried out in this particular field. Biologists have ascertained that the ant paths that can be found around every anthill appear due to aromatic substances, pheromones produced by every ant. The more ants have passed the path, the more their trace smells, and the more new ants it attracts.

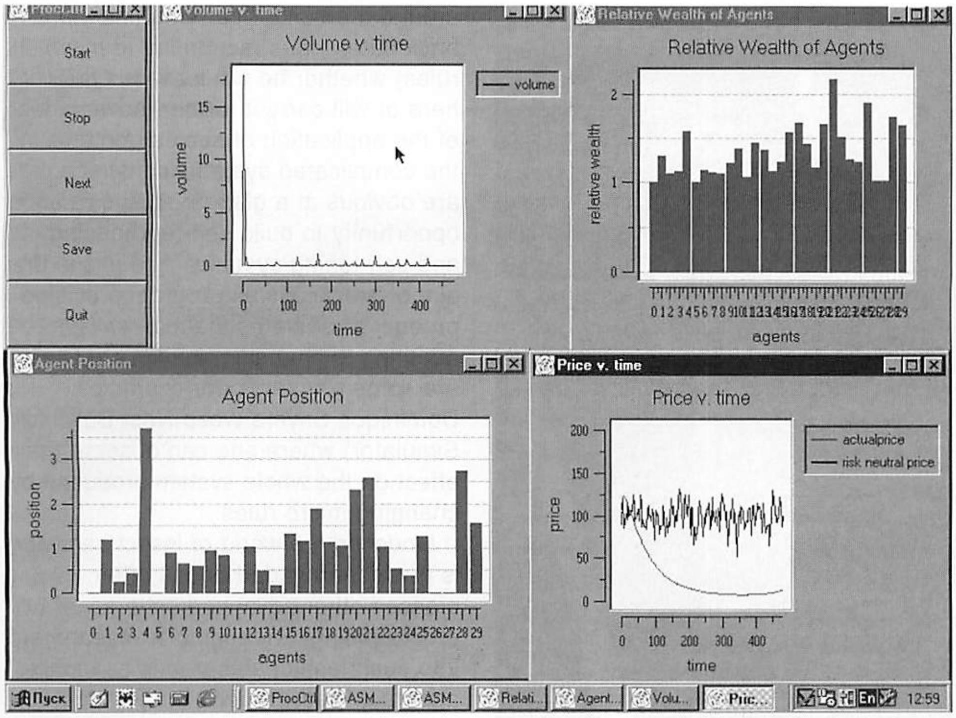
It is this concept basic concept that has been translated into a digital form. The idea of a digital pheromone that traces the path used by one or more digital ants. The idea has been taken from nature but it has had one original addition: To intensify the effect digital pheromones "evaporate" faster when a solution is longer one way than another.

The result of the application of this method is finding the shortest routes to the food, and also dynamic re-planning and optimization of these routes. And what is more, if some part of the path is "overcrowded" a roundabout way is found even if it is longer. When the traffic lessens all the agents return to the optimal way, because the other route is longer its pheromones disappear faster. This peculiarity is used in the majority of the systems in the sphere of telecommunications.



Ants in the net

Let's consider one of the algorithms used in the nets of data transfer. Two sets of mobile agents are created: so called "forward ants" and "backward ants", the agents here are small programs able to move between net units and perform certain tasks. These agents are not connected directly with one another and can transfer their experience via only two information systems, located on every net knot.



At first, on every knot, forward ant (called Fs?d) is created, with destination knot d chosen at random. Every ant chooses the next place of destination, using the information from a routing table on that knot. The next knot is chosen according to the accidental scheme with probability Pdn, depending on optimal route to every next knot n which hasn't been visited yet. If an ant has been to all neighbour knots the next one is chosen at random.

If the route chosen is not available at that moment the ant waits for an access to the connecting line together with all other data packages. An identifier of every visited knot k and the time spent on reaching knot Ts?k, is registered in the memory of the ant. If a cycled transference takes place i.e. an ant gets to a knot already visited, all the data about the knots inside of the cycle are zeroed.

When ant Fs?d gets to destination knot d, he creates a backward ant (called Bd?s), hands over his memory and dies. The backward ant goes along the same way but in the opposite direction. Having arrived at knot k from the previous knot f the backward ant updates the data at the knot with the time value Tk?i, spent on the trip from knot k to every visited knot i on the way k?d.

He also introduces changes in the routing table increasing probability Pif which belongs to every couple of knots i and f and diminishing for the normalization of probability Pin of the rest neighbor knots n. The time Tk?i (mentioned above) spent on the route by the ant Fs?d is used for the determining of the level of probability increase.

There are plenty of other swarm logic schemes on which the routing programs are based. In the simplest ones ants do not have memory they just leave the digit mark on every visited knot. The number of such marks on a definite route serves as a signal for their followers. In addition there can be other variants with the higher priority of the ants over the usual data packets.

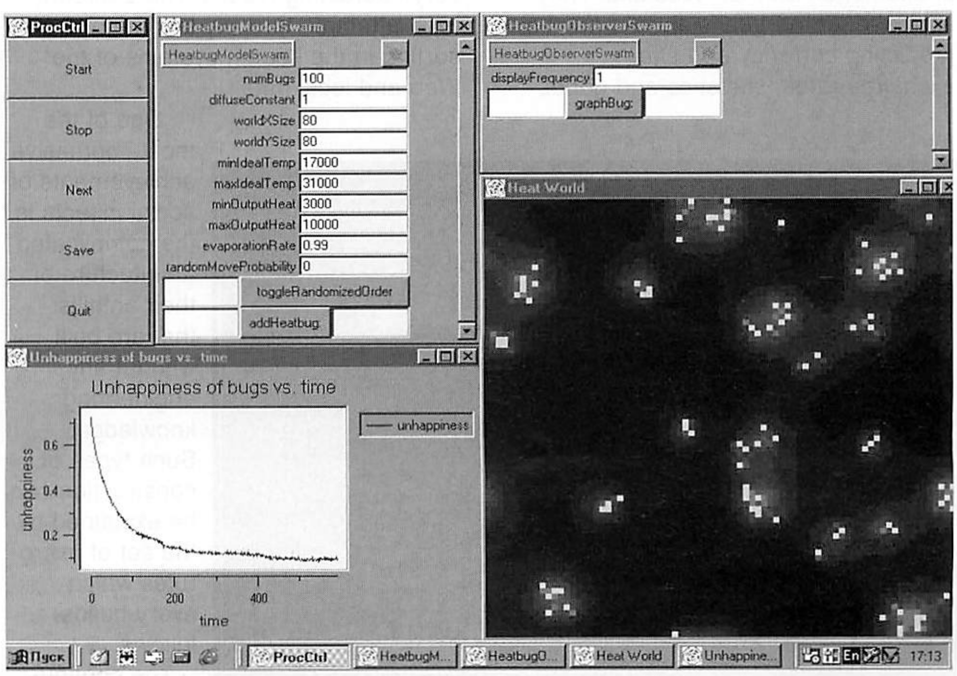
The advantage of these schemes is the fact that the usual data can travel through the net along with the ants, and routes adjusted dynamically with all the changes in workload taken into account. The quality of the work of each algorithm depends of the net configuration, the kind of traffic, and so on and it is a matter of choosing the right algorithm for the task in hand.

It is clear to see, though, how the simple ants can achieve the complex task of creating the most efficient routing in the network dynamically, and changes to the network and the network load make no difference to the ant behaviour but will influence the result.

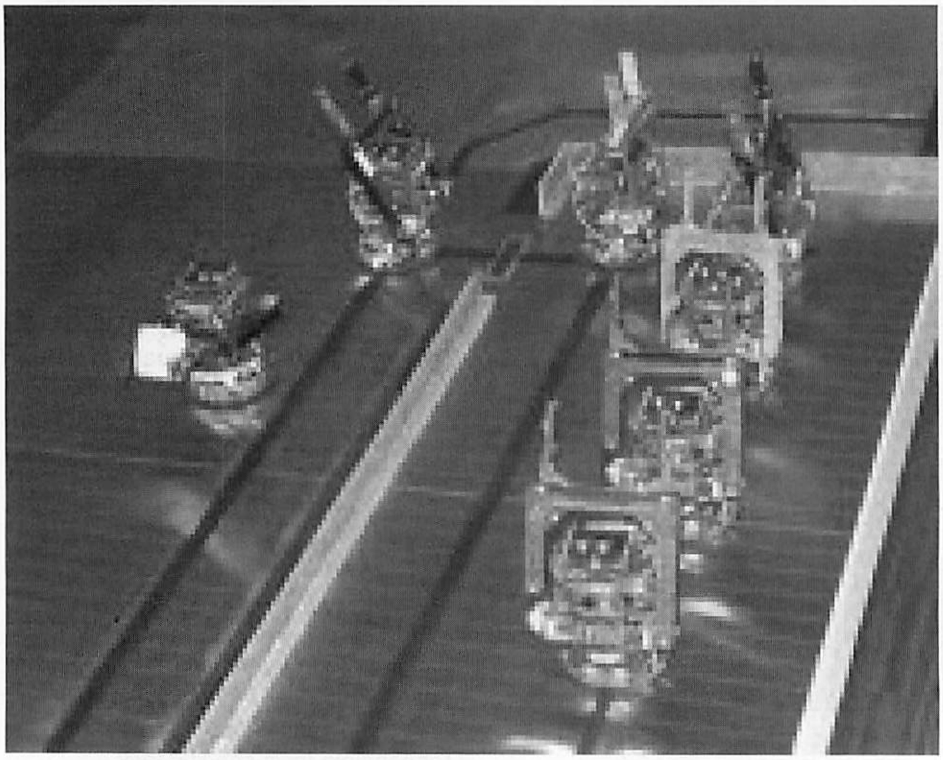
Another very interesting behavioral peculiarity of social insects is the adaptive work division and task distribution. An ant colony is able to distribute tasks among individuals according to the changing conditions. It takes place even when researchers deliberately eliminate a group of insects responsible for a specific task.

What is interesting is that this adaptation takes place without any central control, evaluation of the global situation or direct connection among ants. The model reconstructing the colony behavior based on self-organization deals with threshold values. Every ant has its own threshold value for each task, which must be performed, for example, taking care of the larvae or delivering food.

Stimulus for task performing increases if the task is not done and if this stimulus reaches its threshold value an ant begins to perform the given task. Models built on this



Samples of SDG applications



Above and below:A swarm of miniature robots fan out from a nest in search of food. (J.B. Billeter, Geneva)

principle can be applied in artificial multi-agent systems. They could benefit a company management system, indicating the hidden possibilities of human resources usage and reminders about the urgency of a task.

The next peculiarity is the phenomenon of larvae sorting in the anthill. The French company Eurobios (**www.eurobios.com**) is one of the leading companies in the application of swarm intelligence programs. You can get acquainted with numerous applications of algorithms based on this phenomenon on their Web site. They are used for the financial risks analysis, predicting currency and shares exchange rates, statistics and goods traffic.

In the anthill all the larvae are sorted into groups without any central plan which could point out where larvae and food for them must be carried. A simple model on the basis of agents can easily mimic this behaviour: When the agent "carrying" some object feels a lot of similar objects around he leaves it in this place, the agent who has found the object differing from the rest carries it to another place.

An application of such a sorting algorithm in a database can produce very interesting results. There already exist attempts to apply this method of sorting in the search systems of the Web and local nets.



One of the most impressive achievements of social insects is the complicated architecture of their anthills that are built without any engineering knowledge. Such types of construction can be explained by the set of micro-rules which every builder follows.

The configuration of bricks around the builder carrying one more brick determines (according to micro-rules) whether he will leave his brick here or will carry it further. Advantages of the application of such algorithms in the complicated systems construction are obvious at a glance: They give an opportunity to build self-reproducing and self-tuning systems. And this is the aim of practically all program provision producers, systems that can self-adapting to changing conditions. There are some programs (for example, Dominique Snyers Wasp Nest Building Simulator) where one can observe the effect on the whole system produced by changing micro rules.

Modeling the world of insect behavior is a vast and varied one. It often crosses other advanced spheres of programming. For example, researchers into such fashionable trends as mobile agents or peer-to-peer calculations have shown a lot of interest in Swarm Intelligence study. These mobile agents being of minimal size should fulfil the task given, coordinate their actions with other agents and provide protection against outer attacks.

A great number of examples of programmes for any platform, functioning on these principles can be found in the Internet (many of them are free of charge and are distributed with source code). Numerous examples and libraries are available for the study of such systems, including the whole software environments researchers, for example, SDG (**www.swarm.org**).

This system written in Objective C occupies about 50Mb together with all its libraries, examples, templates and description is distributed free of charge with open initial codes. Another example is ECHO system (**www.santafe.edu/projects/echo.html**) created specially for the study of the agent interaction and complicated adapting systems behavior.

One more example can be mentioned – Multi Agent Modeling Language (NAML) serving for the creation of multi-agent systems. The real quantity of applications on the present subject can be illustrated by more than 32,000 references given for the phrase "Swarm Intelligence" in the Google search field. The subjects covered are anything from picture painting to package routing in IP-nets.

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Part 9: Tracking media

Unfortunately I got very enthusiastic, carried away in fact, between the last issue and this one and programmed a huge amount of new code into the system. Too much to cover in one issue I think so I will give a quick rundown on the overall additions and then just pick one to cover this time.

In the card creation and editing I have added an error window that pops up when you click "Okay", if there are any errors. The card validation window has been extended to make a list of everything that may be wrong with a card so that the user can correct it.

I have added a standard set of query dialogue windows that pop up to check whether you really meant it, under some circumstances.

There is a whole new section that builds a menu of all the records in a given zone, and allows you to select one. The menu also has an option to allow you to create a new record if the one you want isn't in the list.

The general delete code is now implemented and works fine including a pre-delete call to see whether any interested zones want to prevent it.

And finally the backup code has been put in place and it is the backup facilities that we are going to look at in detail this time. The restore code will have to wait until next time.

Backup basics

Data backup is an area of intense interest in the computer world, and there are many fundamental principles that have been developed along with some good maxims for safety of data.

General rules include things like: Don't store your backup on the same media as the main data. If the main media goes down how will you get to the backup? Make regular backups and keep aged versions in case you have to go back further. And keep a record of changes made between backups.

So for our backups we need the ability to put the backups on any attached filing system, keep generations of backups and keep a record of changes as we go along.

Other matters that we should consider are: preventing the application from running if there is no backup area; having generalised code that will work in any application; making it easy to create new backups; automatic backup of data when a new area is created; and having automatic recognition of the backup area. And finally, and very importantly, some way to restore the data from a point in the past.

First we will consider how we are going to hold the backed-up data. We will use a pseudo-application, that is to say a folder with a "!" at the front of it. It will have a !Boot file and a !Run file and a Data folder but nothing else. This has the advantage that the !Boot file is run when it is first seen, we can use that to set up a system variable that shows where the data is.

Inside the Data folder we have a Current folder which, surprisingly holds the latest backup of data and a file containing any more changes. When we do a new backup we change the name of Current to the date when it was made an older generation and a new Current is created.

We set up a variable in the program to keep track of how many generations of backup we want, deleting the oldest when we have enough.

On the programming side, as the program starts up, we check to see if we can find the backup folder, if we can't then we give the user the opportunity to either find it himself and tell the program where it is; or allow him to create a new backup folder. This needs a lot of new S-Base commands which we haven't looked at yet.

One thing that did cause a problem was working out how to make the backup module independent of the rest of the program. The backup module needs to register with each module that wants backup facilities, but if it is independent it has to be told.

But there is a further problem, let's say "backup" registers with "media", when "media" creates a new record it calls all registered modules with "proc [modulename]_media_create". But that means that backup needs to know in advance that it needs "proc backup_media_create". Both of these mean that we can't make backup independent.

But we can take a different approach: Each module that needs backup facilities first registers with backup. In Backup we immediately register back to the one that's calling. Which handles the registration problem, but doesn't solve the procedure name problem.

Here we break the rules: Instead of putting "proc backup_media_create" in the backup module, which is where we said it should be earlier, we put it in the media module with the standard backup call built in.

Arguably this is an unnecessary complexity, after all if we are going to be calling the backup module directly why not just do it in the "proc media_make" routine? Two reasons: the first is purely aesthetic, currently we only need one call to notify all registered modules, if we did it the other way we would have two calls. But what if we haven't included the backup module? The whole program comes crashing down, won't work.

A useful addition would be a call to a routine in "apps" that allows us to check whether a module exists. Then we can decide whether to try to register or not, also where one module requires the existence of another we can check if it's there, and generate an error if not.

So we have made some changes in the "poststart" routines of media and mediatype to only register with backup if it is there. Also, in media, we check for the existence of mediatype and

```
def proc file_found(x)
  return proc fobj_find(x,1)
enddef

def proc dir_found(x)
  return proc fobj_find(x,2)
enddef

def proc fobj_found(x)
  return proc fobj_find(x,3)
enddef

def proc fobj_find(x,z)
  local q=0
  error set 2
  sys "XOS_File",5,@addr(x) to q
  error set 1
  if (@errnum) then error clear
  return (q=z)
enddef

|--------------------------

def proc split_filename(fn,return p,return l)
  local x
  p=""
  l=""
  for x=@len(fn)-1 to 0 step -1
    if (@mid(fn,x,1)=".") then break
    next
  l=@mid(fn,x+1)
  p=@left(fn,x)
enddef
```

Figure I

generate an error if it is not there.

That covers the general principles

and things we have had to consider, so now let's look at the actual code.

In the _init code we set up a lot of variables, most of these contain path names to various bits of the backup

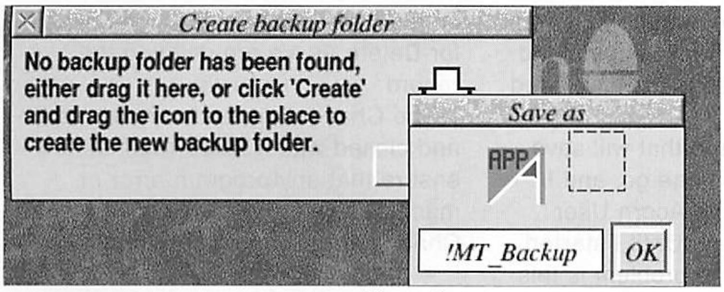


Figure II

folder. Plus the backup folder system variable. There is the usual module registration array plus another array to store the names of the aged backups.

In the _startup routine we dive straight in to the interesting code we have a set of routines (all contained in the "general" set of procedures, Figure I) which detect the presence of files and folders. We call one to see if the Data Backup folder is present, if the system variable is set then it will be found otherwise not.

If it is not found we pop up a new window which invites the user to either drag the Data Backup folder to the window, or create a new one by

```
local ft,fn
load check insert ft,fn
case (ft)
  when FILETYPE_DIR,FILETYPE_APP
    load insert
    ok=TRUE
    if (ok) then ok=ok&&(proc file_found(fn+".!Boot"))
    if (ok) then ok=ok&&(proc file_found(fn+".!Run"))
    if (ok) then ok=ok&&(proc dir_found(fn+".Data"))
    if (!ok)
        error 99,"This is not a properly constructed Data Backup Folder"
        break
      endif

    local x=@str(32),ch=@openin(fn+".!Boot"),me=@applinfo(0)
    set ptr ch,2
    import text ch,x ext @len(me)
    if (x<>me)
        error 99,"This is not a Data Backup Folder for "+me
        ok=FALSE
        break
      endif

    oscli("Run "+fn+".!Run")
    ok=TRUE
    card exit poll @handle

  otherwise
    error 99,"Cannot use a file"
  endcase
```

Figure III

clicking the create button and dragging the icon to some disc location (Figure II). If either of these actions occur the results are handled in one of the backup handler routines.

First let's look at the "import" handler (Figure III). Once this is set up in the backup Handler set this handler will be called whenever something is dragged to the window, you can have handlers for individual icons.

The first command is "load check insert ft,fn" this starts up a file transfer (there is a command for direct data transfers between applications but we don't need that this time). After this command 'ft' contains the filetype that's being imported and 'fn' contains the filename and path.

The first thing we do is check that the filetype is right, it has to be either a directory or an application (file types &1000 and &2000). If they are right then we simply acknowledge the drag with "load insert", normally you would use this after the file has been loaded but we are not actually

```
local backup_saver

def proc backup_saver(dir)
  local ok=FALSE,cmd="CDir "+dir
  error set 2
  sys "XOS_CLI",@addr(cmd)
  error set 1
  if (@errnum)
      error @errnum,"Can't create Data Backup Folder because: "+@errstr
      error clear
    else
      local fn,ch
      fn=dir+".!Boot"
      ch=@openout(fn)
      print to ch,"| "+@applinfo(0)+" "+@applinfo(3)+" ("+@str(@date:"date")+")"
      print to ch,"Set MT_Backup$Dir <obey$dir>"
      print to ch,"Set MT_Backup$Data <MT_Backup$Dir>.Data"
      close ch
      oscli("SetType "+fn+" Obey")
      fn=dir+".!Run"
      ch=@openout(fn)
      print to ch,"| "+@applinfo(0)+" ("+@str(@date:"date")+")"
      print to ch,"If ""<MT_Backup$Dir>""<>""<Obey$Dir>"" Then Run <Obey$Dir>.!Boot"
      close ch
      oscli("SetType "+fn+" Obey")
      oscli("Run "+fn)
      oscli("CDir "+dir+"."+_backup_dataname)
      oscli("CDir "+dir+"."+_backup_dataname+"."+_backup_crntname)
      ok=TRUE
    endif
  return ok
enddef

case @clickelementlabel
  when "<close>"
    ok=FALSE
    card exit poll @handle

  when "create"
    save to "!MT_Backup",FILETYPE_APP,0,"backup_saver",,,ok
    if (ok) then card exit poll @handle

  endcase
```

Figure IV

loading anything this time.

The code then goes through the process of verifying that the dragged object has the right files in it, generating an error is if doesn't. Having established the files are right, the code then loads up the first bytes of the !Boot file and checks that the application name is the right one:

`me=@applinfo(0)`

Gets the name of the current application from the Info window.

`set ptr ch,2`

Points the file pointer at byte 2 of the !Boot file

`import text ch,x ext @len(me)`

Extracts a number of bytes, equal to the length of the application name and puts them into variable x as a string.

Then we just check to see if the string we've just loaded is the same as the application name. If not we generate another error and exit.

Finally we run the !Run file which will ensure that the system variable is run and set up correctly so we can then continue. The card is closed.

Alternatively the user clicks "Create". Looking at Figure IV which is the click handler we actually start at the bottom where the "save to" command pops up a standard save box, with the given filename, filetype and the routine to call when the save must occur. This command also allows you to start a direct memory transfer to another application, or a print if the drag is done directly to a printer icon.

Assuming everything is in order the routine "backup_saver" is called. This is an example of a local procedure definition, by putting the procedure name into a local command and then defining it we can be sure it will never clash with another procedure name elsewhere.

The parameter "dir" to the routine gives the name and path of the object to be created. We want a directory (with a ! at the front it becomes an application) so have to issue a command line command using the OS_CLI system call.

S-Base provides some help here, first we have to change the error setting to prevent any error causing a crash, then we set it back to normal after the call. S-Base will automatically have set up the error functions @errnum and @errstr with the error number and message. So we can check if an error has occurred and if so say what it is and just return.

You can test this by deleting any Data Backup folders you have created and then trying to create to create one on a CD or in the Apps directory (which is read only).

Once we are sure this is a place that you can create things, we create a !Boot file and then output the text lines needed to it. Close it and change its filetype to an Obey file.

```
def proc backup_register_item(ii)
  backup_curitem+=1
  backup_items[backup_curitem].name=ii
  backup_items[backup_curitem].regnum=@eval("proc "+ii+"_register_item(""backup"")")
  if (!proc file_found(_backup_crntpath+ii)) then proc backup_make_archive(backup_curitem)

  return backup_curitem
```

Figure V

We do the same for the !Run file and then run the Run file (which runs the !Boot file) and the system variable is set up. Finally we create the Data folder. Assuming everything has been

```
def proc backup_make_archives
  local x,y,f,n
  oscli("cdir "+_backup_crntdir)
  delay on
  ffor x=0 to backup_curitem
    delay x*100/(backup_curitem+1)
    proc backup_make_archive(x)
    next
  delay off
enddef

def proc backup_make_archive(x)
  n=@trim(backup_items[x].name)
  f=@openout(_backup_crntpath+n)
  @exec("archive csv def f, file "+n)
  ffor y=1 to @recordcount(n)
    if (!@deleted(n,y))
        load n,y
        @exec("archive csv f, "+n)
      endif
    next
  close f
  oscli("SetType "+_backup_crntpath+n+" 16_dfe")
enddef
```

Figure VI

okay we close the Data Backup Folder window and continue.

The last stage of the startup, assuming everything has been okay so far, is to check for the existence of the ChangeLog file and create one if it's not there.

During the registration phase of _poststart, a module registers with backup, and backup registers back again. In addition a check is made to see if this object already has a backup of itself in the Data Backup Folder, if it doesn't then a backup is done. This means that when a new Data Backup Folder is created a new set of file backups will automatically be stored. (Figure V.)

In Figure VI you can see the routines that actually perform the data backups. The first one backs up every file currently registered, the second does each individual file. And that's the one we will pay attention to:

First we get the name of the object and open a file in the correct place. The files we will create are full CSV files with the field names as the first line. The "archive csv def" command saves the field names as the first step. We have to use the @exec command because the same code is being used for different files.

There is a command that will save the whole data file in one go, and I used to use it with the Acorn User subscription database. Until I started getting anomalies. the problem is this: S-Base marks deleted files as deleted, but doesn't actually remove them, which is absolutely fine under most circumstances.

However the "archive csv" command which saves the whole data file also saves the deleted files, with nothing to indicate whether they are deleted or not. When the data is restored back into the system the deleted files get loaded back in and are no longer marked as deleted.

So instead we have to go through each file in turn and only save it out if it is not deleted. This takes longer but avoids any trouble. Once the file is created it has its filetype set to CSV.

```
def proc backup_create(zn,zr)
  local zi,cq,clog=@openup(_backup_crntpath+"ChangeLog")
  set ptr clog,@ext(clog)
  @exec("cq="+zn)
  load zn,zr
  zi=@filefield(zn,"id")

  archive csv clog,BACKUP_CREATE,zn,zi
  @exec("archive csv clog,"+zn)

  @exec(zn+"=cq")
  close clog
enddef

def proc backup_edit(zn,zr)
  local zi,cq,clog=@openup(_backup_crntpath+"ChangeLog")
  set ptr clog,@ext(clog)
  @exec("cq="+zn)
  load zn,zr
  zi=@filefield(zn,"id")

  archive csv clog,BACKUP_UPDATE,zn,zi
  @exec("archive csv clog,"+zn)

  @exec(zn+"=cq")
  close clog
enddef

def proc backup_delete(zn,zr)
  local zi,cq,clog=@openup(_backup_crntpath+"ChangeLog")
  set ptr clog,@ext(clog)
  @exec("cq="+zn)
  load zn,zr
  zi=@filefield(zn,"id")

  archive csv clog,BACKUP_DELETE,zn,zi

  @exec(zn+"=cq")
  close clog
enddef
```

Figure VII

The change log

When any record is created, changed or deleted we have to record it in the change log. This is achieved by the various "backup_" calls being made, as in Figure VII.

What we do is output three items of data, first a code for whether this is a Create, Update or Delete, then the name of the record type and finally the record's unique ID number. Then, for Create's and Update's, we also output the record as CSV data, so that we can load it in later and re-do the create or the update. We don't need it for Delete as we are deleting the record.

The ChangeLog is always opened and closed within these routines to ensure that any program error or machine reset mid-run won't leave the ChangeLog in a corrupted state.

```
def proc backup_new
  oscli("rename "+_backup_crntdir+" "+_backup_datapath+proc backup_newname)
  proc backup_make_archives
  proc backup_delete_oldest
  proc backup_createclog
enddef

def proc backup_newname
  local t=@time,n=proc bxn((@timey t)%100)+proc bxn(@timemoy t)
  return n+proc bxn(@timedom t)+proc bxn(@timeh t)+proc bxn(@timeu t)
enddef

def proc bxn(n)
  return @str(n//10)+@str(n%10)
enddef

def proc backup_delete_oldest
  local count=0,fwipe=""
  select file _backup_datadir,"*",proc bdoxa,2
  while (count>_backup_aged)
    select file _backup_datadir,"*",proc bdoxb,2
    if (fwipe>"") then oscli("Wipe "+fwipe+" FR~C~V")
    count-=1
    endwhile
enddef

def proc bdoxa(f)
  count+=1
  return FALSE
enddef

def proc bdoxb(f)
  if (count>_backup_aged) then fwipe=f
  return TRUE
enddef
```

Figure VIII

New backups

The final stage of this is when we actually want to do a new backup of all the data. This is done through the iconbar icon menu. What we have done here is created a new menu item, Utilities, which leads to a sub-menu and on there we have added "Backup..." and "Restore..."

The first of these changes the name of the backup data folder "Current" to the current date and time (in a "YYMMDDhhmm" format); creates a new data backup folder, puts archives of all the objects into it and then creates a new ChangeLog file. (Figure VIII)

If the number of backup folders exceeds the number of aged ones we want it also deletes the oldest. The routine that does this is a bit unusual. It utilises the "select file" command which accesses every file in a given directory that matches a pattern (in this case, all files), it counts them, and then goes through them again and deletes the oldest. A bit kludgy but it works.

Next time we will run through the restore option and see how that works, it is much more straightforward then the backup procedures. Plus we will examine the menu creation and handling from other cards.

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Part 6: Dr Wimp in practice

Continuing with the pattern established in the earlier articles, this article will start with !MyApp6 as we left it last time and develop it further. Also as before, we will start by copying and renaming !MyApp6 to become !MyApp7 and actually start with that and the Acorn User Web site has a copy of this all ready to go, in the folder StartApp6.

So far, our developing application has used its main window solely as a backdrop for displaying icons. In this final article we are going to look at graphics, by which we mean displaying pictures and/or text directly onto the window background instead of in icons.

The Wimp calls the defined area of a window its 'work area' and the displayed portion of the work area is called its 'visible area', that is the visible area cannot be larger than the work area.

For defining positions within a window the Wimp uses the top left corner of the work area as its origin, the point (0,0). This has many advantages because the top left corner of a page is, in English anyway, always regarded as the natural starting point. However, if we use this same point for graphical coordinate reference it also means that the visible parts of a window always have 'work coordinates' which have positive x-values but negative y-values.

Outside the window (e.g. to define where a window sits on the screen) the Wimp necessarily still uses the bottom left corner of the screen as its conventional graphical origin, 'screen coordinates'. Figure I shows the situation.

It is important to appreciate why both 'work' and 'screen' coordinates are highly desirable. When we move (or resize, scroll or overlap) a window it is repeatedly deleted in one place and redrawn in another. Throughout, the graphics in the windows need to stay in their same 'work' positions, but their 'screen' positions need to vary. The Wimp takes care of this for icons automatically. If we also consider printing then 'paper coordinates' need to be added to the scene...

So a programmer sometimes needs to convert between these coordinate systems and hence there is an area of potential confusion here.

Fortunately, all the really difficult stuff is handled automatically by the Wimp, and Dr Wimp reduces the remaining complications to a minimum.

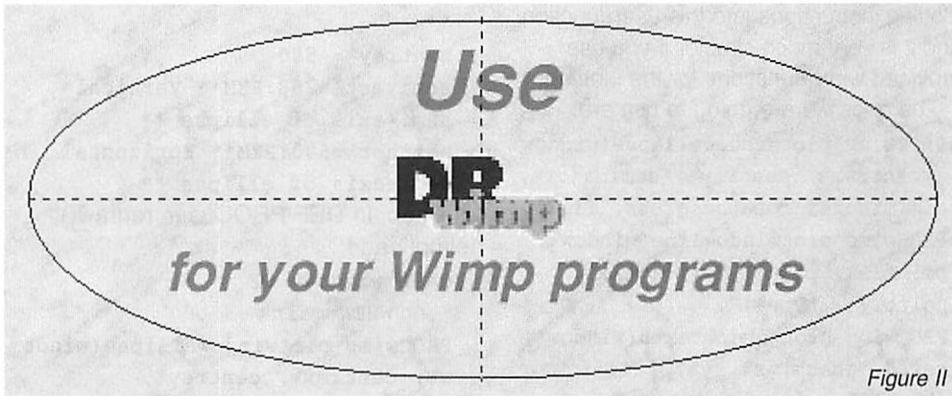


Figure II

Hands on

Let's see things working in practice. So, take a copy of the starting !MyApp7 and use this for all the changes in this article.

The first thing we need to do is change the definition of our main% window so that the Wimp knows we are going to put text/graphics onto it directly.

This is done by loading the window template file Templates into !TemplEd; double-clicking on the Main window to open it; double-clicking on the window background to open the Edit template 'Main' window; clicking on the Auto-redraw button (to un-tick it) and clicking on Update & Exit. Then save the template again.

When you click on Update & Exit, you will see that the Main window background becomes cross-hatched. This is to confirm that Auto-redraw is 'off'. The cross-hatching will not appear in the window when used in the application.

What we are now going to do is draw the picture in Figure II in the window main%, below our existing icons. This picture comprises:

- 1 ellipse;
- 2 dotted lines, centralised;
- 2 lines of text (same font but different sizes);
- 1 drawfile (here containing a sprite). A copy of the drawfile is in the !MyApp7 application directory contained in EndApp6 folder on the Acorn User Web site.

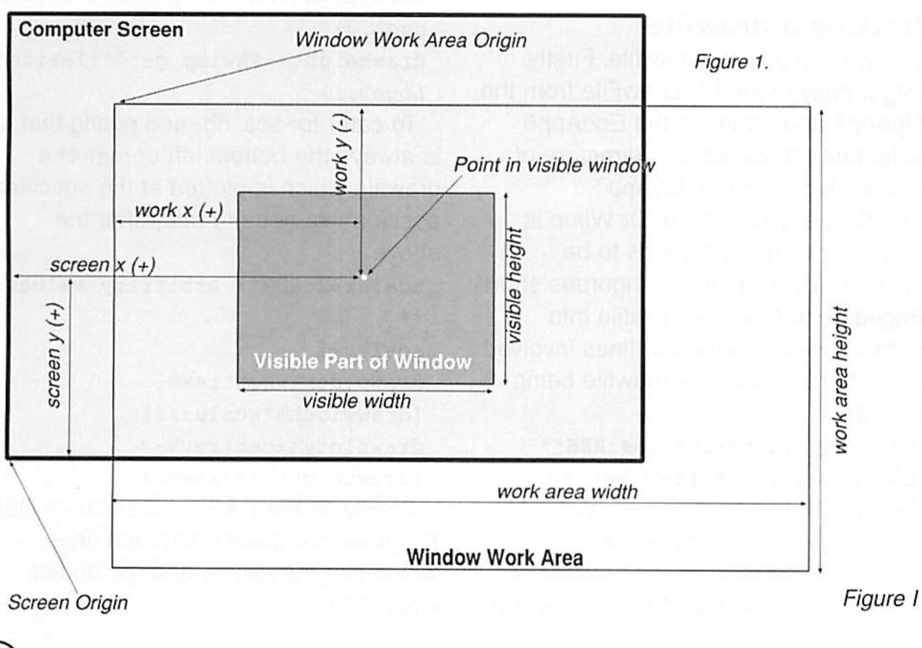


Figure I

The redraw process

In the earlier text above we referred to the fact that moving a window means repeatedly deleting the existing window and redrawing it in a different place. It might therefore not be too much of a surprise that to display graphics/text in a window the Wimp uses something called the 'redraw process' and Dr Wimp effects this with the user-function:

```
DEF
PROCuser_redraw(window%,minx%,miny
%,maxx%,maxy%,printing%,page%)
```

This looks somewhat more complicated than it actually is, but in this article we only need to concern ourselves with the first parameter. (The Dr Wimp Manual gives

fuller details, of course.)

All we have to do is to put our required plotting instructions into this user-function, and it is very much simpler if you use provided wimp-functions for the plotting.

The ones we are going to use are:

```
PROCwimp_plotwindowellipse(window%
, centrex%, centrey%, semimajor%,
semiminor%, rotatedegrees, fill%)
PROCwimp_plotwindowline(window%,
point1x%, point1y%, point2x%,
point2y%, type%)
PROCwimp_plotwindowtexth(window%,
text$, fhan%, x%, y%, fr%, fg%,
fb%, br%,  bg%, bb%, minx%,
miny%, maxx%, maxy%)
PROCwimp_renderwindow(window%,
dfile%, bx%, by%, minx%,  miny%,
maxx%, maxy%, xscalereal,
yscalereal, origin%)
```

These are only a few of a very large number of wimp_functions in the Dr Wimp graphics/text arsenal.

Note that these four each include "window" in their name, which tells you that they are specifically designed to draw something in a window. And further to this, their first parameter is the handle of the window you want to operate on.

Let's start with the ellipse to see how these wimp-functions work in practice.

Looking at:

```
PROCwimp_plotwindowellipse(windo
w%, centrex%, centrey%,
semimajor%,  semiminor%,
rotatedegrees, fill%)
```

This draws an ellipse. centrex%,centrey% are simply the work area coordinates (in OS units) of the centre of the required ellipse. And semimajor%,semiminor% are the major/minor 'radii' required, again in OS units.

We could draw the ellipse rotated about its centre if we wished, simply by putting the required rotation angle in degrees in rotatedegrees (Positive values rotate the ellipse anti-clockwise, and note that this parameter is not integer).

And the final parameter gives us the choice of plotting a filled ellipse or just its outline.

It is best to do some preparation before we call this plotting wimp-function. So, load the !RunImage from your working copy of !MyApp7 into your Basic editor and add the following lines to the end of DEF PROCuser_initialise, just before the ENDPROC line.

```
centrex%=600:REM** Work position
(OS units) of centre of ellipse
**
centrey%=-500
semivert%=200:REM** Vertical
semi-axis of ellipse **
semihor%=500:REM** Horizontal
semi-axis of ellipse **
```

Then, in DEF PROCuser_redraw(), simply add:

```
CASE window% OF
    WHEN main%
PROCwimp_plotwindowellipse(windo
w%, centrex%, centrey%,
semihor%, semivert%, 0, 0)
ENDCASE
```

Now save the !RunImage and run the application. You'll see the ellipse duly plotted, but you might have to toggle the window to full-size to see it all. Check that all is well by moving/scrolling/covering the window.

You shouldn't have any trouble following the next two lines either. They plot the two dotted lines bisecting the ellipse. Add them to the above CASE statement immediately after the ellipse-plotting line:

```
PROCwimp_plotwindowline(window%,
centrex%, centrey%+semivert%,
centrex%, centrey%-semivert%, 1)
PROCwimp_plotwindowline(window%,
centrex%-semihor%, centrey%,
centrex%+semihor%, centrey%, 1)
```

After the window handle parameter, the first pair of parameters give the x/y coordinates of one end of the line and the following pair are for the other end. The final parameter is 0 for a full line or 1 for dotted.

Again, re-save and re-run to check the result.

Plotting a drawfile

Now we come to the drawfile. Firstly, drag a copy of the file DrawFile from the !MyApp7 application in the EndApp6 folder into the application directory of your working copy of !MyApp7.

Plotting any drawfile in Dr Wimp is straightforward but it needs to be preceded by a simple but rigorous short procedure to load the drawfile into memory. Here are the few lines involved when there is only one drawfile being plotted:

```
PROCwimp_initdrawfiles:REM**
Essential first step but only
needs to be done once, even if
more than 1 drawfile is
involved. **
drawfile$="{MyApp7$Dir}.DrawFile
":REM** Our drawfile. **
size%=FNwimp_measurefile(drawfil
e$):REM** Measure size of file.
**
DIM Logo% size%:REM** DIM a
memory block to hold drawfile.
**
dummy%=FNwimp_loaddfile(drawfile
$,Logo%):REM** Load drawfile
into memory block. **
```

Add those line to DEF PROCuser_initialise after the previous additions.

The REMs guide you through it but the last line needs more explanation. The wimp-function FNwimp_loaddfile() is designed to cater for loading more than one drawfile into a single block of memory and the full procedure for doing this is in the Dr Wimp Manual. This wimp-function actually returns the starting address in memory for the next drawfile to be loaded. But we have only one drawfile in this case so we do not need the return value here and it is accordingly assigned to dummy%.

The end result of the above sequence is that our drawfile is loaded into memory with a starting address (handle) called Logo%, which nicely describes it.

In our particular example we want to plot the drawfile so that its centre coincides with the centre of the ellipse, so we need to know the physical size of the drawfile when plotted, taking account of any scaling we might want to introduce. Dr Wimp provides a wimp-function for finding the size of a drawfile and we need to use it twice, for width and height respectively. So also add the following after the previous addition:

```
drawwidth%=FNwimp_getdfilesize(L
ogo%,0)
drawheight%=FNwimp_getdfilesize(
Logo%,1)
```

To cater for scaling, and noting that it is always the bottom left corner of a drawfile which is plotted at the specified position, we need to add, after the above:

```
scalex=2:REM** Arbitrary values.
**
scaley=2
drawplotx%=centrex%-
(drawwidth%*scalex/2)
drawploty%=centrey%-
(drawheight%*scaley/2)
```

Finally, in the CASE statement in DEF PROCuser-redraw(), after the lines which plot the ellipse and the dotted lines, add:

```
PROCwimp_renderwindow(window%,
Logo%, drawplotx%, drawploty%,
minx%, miny%, maxx%, maxy%,
scalex, scaley, 1)
```

Now re-save and re-run to see the result.

We need to comment on two other aspects of the above line. Firstly, the natural origin of a drawfile is the bottom left corner of the 'page' when you load it into !Draw. But you will often see that the actual drawing has unused space between it and that corner.

The final parameter (0 or 1) usefully allows you to choose between plotting the drawfile as it appears on the 'page' (0) or plotting it with any 'bottom left space' effectively removed (1). The latter has been chosen here.

Secondly, note that we have apparently ignored the mysterious minx%,miny%,maxx%,maxy% sequence of parameters which appears in both the above line and in DEF PROCuser_redraw(). In fact we have simply 'carried them through'. They do not need to concern us here but they describe a 'clipping rectangle' which can be used to avoid redrawing the whole of a graphic object when, say, parts of it are covered and uncovered by other windows.

Plotting text

Finally we come to the two lines of text, which are in different font sizes and we want to plot them centred in the ellipse.

To plot text we need to specify both the font and its size. The Wimp uses 'font handles' which define a font/size pair, so we will need two font handles if we are going to use different sizes, although their font names will be the same. A simple wimp-function provides the font handles for us. Once we have declared a font handle for a particular font/size pair we do not need to do it again if we want to use the same pairing for some other text during the run of the application.

So, the preparation we need this time, to be added at the end of DEF PROCuser_initialise, is:

```
font$="Homerton.Bold.Oblique":RE
M 'Period separated' font name.
**
point%=36:REM** Arbitrary size
of first line of text. **
fonthandle1%=FNwimp_getfont(font
$,point%):REM** Get font handle
**
text1$="Use":REM** First line of
text. **
textwidth1%=FNwimp_gettextsizeh(
text1$,fonthandle1%,0):REM** On-
screen width of text (in OS
units) when plotted. **

REM** Do similar for second line
of text. **
point%=24
fonthandle2%=FNwimp_getfont(font
$,point%)
text2$="for your Wimp programs"
textwidth2%=FNwimp_gettextsizeh(
text2$,fonthandle2%,0)

REM** Calculate text plotting
start for centred text. **
textstart1x%=centrex%-
(textwidth1%/2)
textstart1y%=centrey%+100:REM**
Arbitrary vertical shift up. **
textstart2x%=centrex%-
(textwidth2%/2)
textstart2y%=centrey%-100:REM**
Arbitrary vertical shift down.
**
```

This should be fairly straightforward to follow. FNwimp_getfont() is the wimp-function that returns a font handle for a given font/size pair. FNwimp_gettextsizeh(), note the "h", is a very useful wimp-function which tells you the width or height (in OS units) that the text string will occupy on the screen when plotted. This allows very accurate placing of text and here we use it to shift the start of the text lines so that the text appears as centred in the ellipse.

With the above preparation, we now just need to add the following two lines inside the CASE statement in DEF PROCuser-redraw(), after the line which plotted the drawfile:

```
PROCwimp_plotwindowtexth(window%
, text1$, fonthandle1%,
textstart1x%,  textstart1y%,
255, 0, 0, 221, 221, 221,
minx%, miny%, maxx%, maxy%)
PROCwimp_plotwindowtexth(window%
, text2$, fonthandle2%,
textstart2x%,  textstart2y%,
255, 0, 0, 221, 221, 221,
minx%, miny%, maxx%, maxy%)
```

These follow the same pattern as the drawfile plotting, with the added facility to specify the foreground and background colour of the text. (Here, Red foreground on Light Grey background, the latter to match the window background.)

Finally, re-save and re-run to check the final appearance, and there you have it!

This article has outlined one of many ways in which graphics/text can be displayed in a window. Dr Wimp offers a very wide selection of alternative ways, including plotting sprites (and, soon, JPEGs) directly. Each option has its own advantages in different situations and thus Dr Wimp gives the programmer great flexibility.

Final comments

A copy of the final version of !MyApp7 with all the changes made this time is in the folder EndApp6 on the Acorn User Web site.

Next time

There is no next time! This short series has only touched the surface of what Dr Wimp can do but it is more than sufficient to demonstrate how it takes the pain out of Wimp programming.

The Dr Wimp Manual contains a tutorial aimed specifically at newcomers to the package and it is very worthwhile to follow it.

If you want to see some software authored with Dr Wimp by different people then my Web site offers several freeware and shareware applications, with links to download them.

Contacts

Download the Dr Wimp package from my Web site at:

www.argonet.co.uk/users/rayfavre/

and this site also contains details of my books "Starting Basic" and "Dr Wimp's Surgery" which are sold entirely for charity.

E-mail: rayfavre@argonet.co.uk

Exceptionally, printed versions of the separate panels missing from the first article of this series are also available on receipt of an SAE at the address below.

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Converting from Windows to RISC OS

As a background to this article, I'll give you a little information about myself so that you know where I'm coming from. My first computer was a BBC Micro, Model A, I learnt Computer Studies in the sixth-form, and continued to study an HND in Computer Studies. I then started my professional career, programming mainframes and now programming PCs.

I never abandoned my interest in Acorn computers, and had a BBC Master before upgrading to the dizzy heights of an A3010 (with HCCS microprodule & hard disc) and now own a Risc PC, an A7000+ and, most recently, a secondhand A4. I now unfortunately know PCs better than my, preferred, Acorns! Like most RISC OS users, I don't like PCs but will admit that there are PC facilities that are not available on RISC OS.

This article is intended as a guide for the Microsoft Windows user to learn the equivalent or additional features available in RISC OS. Where I know of any RISC OS software that does an equivalent of a Windows function, I shall quote it. It is not meant to be an all-encompassing document for learning the RISC OS environment, for this you should contact Paul Vigay's "RISC OS Academy" for a correspondence course.

My first WIMP (Windows, Icon, Menu, Pointer) machine was an A3010, and from that I had to convert to Windows 3.1 and Windows 95 on PCs. As Windows 3.x and earlier are now generally regarded as 'old hat' I shall concentrate on the later versions of Windows, those with a 'Start' button (Windows 95, 98, NT, 2000 and XP).

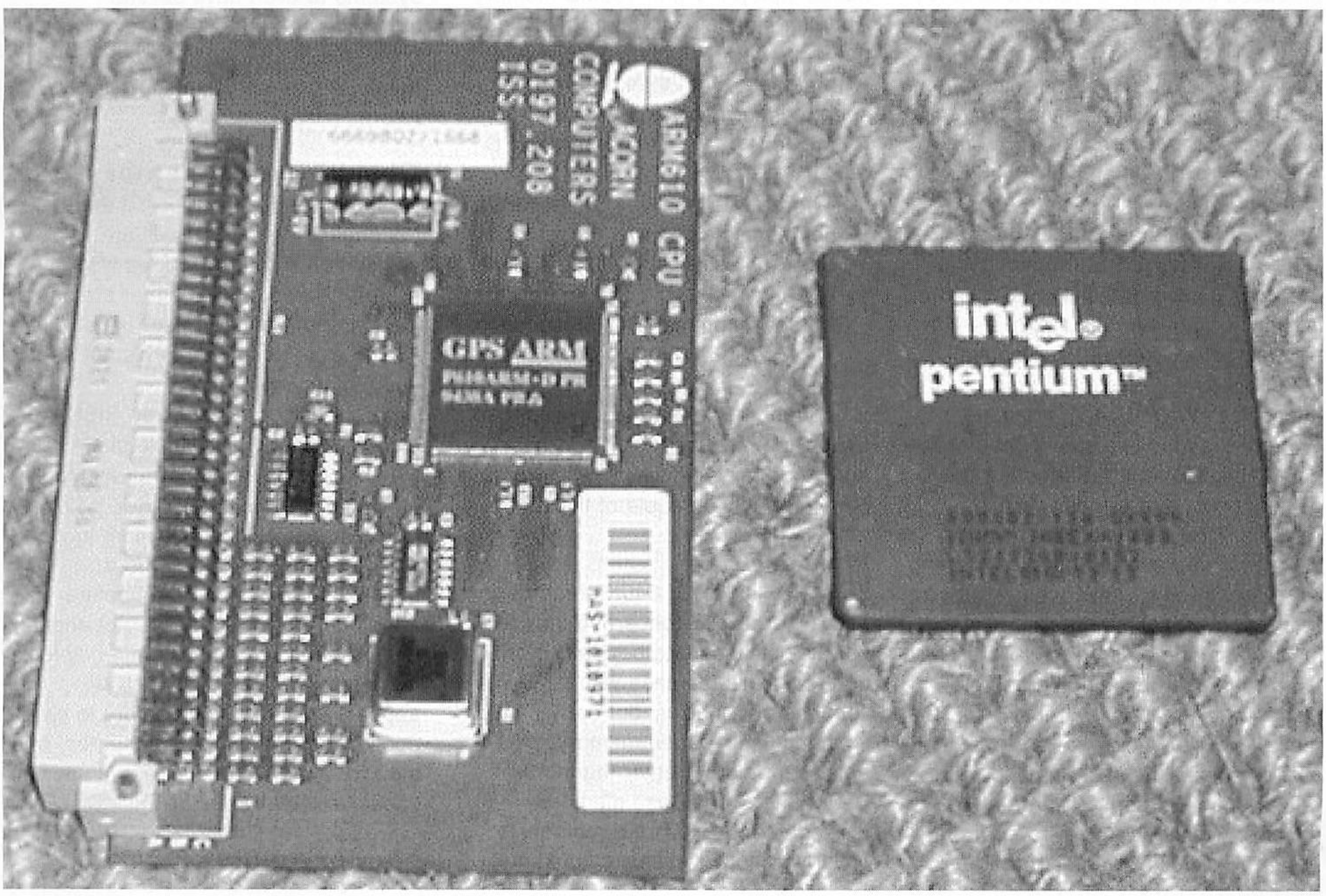
For RISC OS, I'm only considering the versions of the OS I'm familiar with, i.e. RISC OS 3.6 and RISC OS 4.02. For Microsoft Windows, I haven't bothered to find out whether a similar system/software is available for a RISC OS feature, as I'm really not interested in doing so. This is after all, an Acorn publication, and there are other people far more qualified to disclose this information in PC circles.

Looking at hardware

PC processors started with the Intel 8088 in the mid-eighties (around about the same time as the BBC Micro's 6502). From then they changed to the Intel 8086, and the numbering continued from this chip in a logical sequence, by adding an additional figure in the middle of the number, 80186 (which was used in the BBC Master 512K PC co-processor emulator, but not many, if any, PCs) followed by 80286, 80386 and so on.

In the early nineties Intel became irritated that other companies were ripping off their chips and calling them by the same name, 80486. They were told that they couldn't copyright a number, hence the copyrightable name 'Pentium' came into being. This was in effect the 80586 chip, I think that a Pentium II being in effect an 80686 etc, or what they now call 'Family 6', but I haven't investigated this.

In contrast, Acorn produced machines with 6502 chips (BBC Micros, Electrons), and then the BBC Master with the faster 65C02 chip. In the late eighties/early nineties they designed and manufactured the ARM (Acorn RISC Machine) chip, the revolu-



tionary RISC processor which was included in the early Archimedes series WIMP-based machines running Arthur, a forerunner to RISC OS.

The ARM2 chip followed, to be later replaced by numbered ARM chips like the the ARM3 in the A4 Laptop and the redesigned ARM2, called the ARM250 in the A3010 and A3020. The ARM 610 and ARM710 are used in Risc PCs and the ARM 7500 is used in the A7000 and A7000+ running under RISC OS.

Acorn spun off the company ARM Ltd to continue developing the chip set. ARM Ltd don't manufacture they only design and license those designs to other companies. Intel became one of those licencees and, using their excellent chip manufacturing technologies, created a super-ARM chip called (and it's an appalling pun) the 'StrongARM'. The StrongARM will only work on RISC OS versions 3.7 and above. The next stage of Intel development are the XScale processor chips based on the the Strong ARM.

The mainstay of RISC OS

The Risc PC was a revolutionary step in computer design, and a credit to the Acorn designers in that it's still being produced in a more advanced form (by Castle) almost 10 years later. It allowed for the first time, a PC environment and an Acorn environment running on the one machine.

So far as I'm aware there are only 486 and 586 (aka Pentium I) versions of the hardware. The system uses an 'image' of a PC hard disc (stored as a file on the RISC OS hard disc) which becomes locked out while the emulator is running but when it's not, the entire disc image can be read/written via RISC OS as if it was a PC disc attached to the RISC OS machine.

There are only two screws in the entire Risc PC, one for securing the power supply and one for earth bonding. This machine can have a processor upgrade merely by swapping a 'processor card', which is really easy to fit. So no silly fiddling around with jumper settings as on a PC.

Acorn ceased building computers, just prior to the launch of the Risc PC 2 aka Phoebe. They went on to produce digital TV systems under the brand name Element 14, and have effectively disappeared. The operating system, RISC OS, was sold to Pace and the hardware side of Acorn Computers, (including the brand name) was taken on by Castle Computers, who continue to develop the original Risc PC, and A7000+, among others.

Processor performance

Although PC processors speeds are quoted as being higher than ARM chips, this is not an accurate indicator of performance. PC chips have to do a lot more work than ARM chips, not least because the PC uses CISC (Complex Instruction Set Computing) technology, as opposed to the newer, simpler and faster RISC technology. As a comparison in 1994 the then new Risc PC's 30MHz ARM 610 had roughly the same performance as a PC 66MHz 80486DX/2.

I use an ARM7500FE in my A7000+ and it appears to be a great deal faster than any PC I've used, even though it's only rated at 48MHz! Of course, the software on the Acorn platform is far more efficiently written than that on PCs, so this has an effect as well.

I did a simple time-check for a comparison of this A7000+ machine with 24Mb memory (standalone, never networked) and my work Intel Celeron-based laptop PC with 195MB memory (running standalone, but normally on a network) with 573Mb of swap-space (virtual memory). I think the results speak for themselves:

Function	Laptop PC A7000+
Power to NT login	55 seconds
Login to system start	60 seconds
Power to system start	35 seconds (no network)
Shutdown command	55 seconds 2 seconds

I bought the A7000+ secondhand for £150 (and have seen some for £5), and God knows how much the laptop cost, probably a couple of thousand.

Memory

Early PCs only had 640K of memory, and as far as I'm concerned they still do, they still seem to be really slow! I don't think it's the case with later versions of Windows, but early versions used 'paged memory' to access memory greater than 640k. Hence there was Base memory, Extended and Expanded memory.

Early Windows systems could only see a limited amount of memory at any one time, and so had to swap portions of this additional 'paged' memory into active memory and swap it out afterwards. This obviously slowed things down.

The BBC Micro (model A) had 16k of memory, but could be upgraded to 32k of memory. The BBC Master had 128k of memory (which went up to the dizzy heights of 512K under the DOS emulator. Early Archimedes systems had 1 or maybe 2Mb of memory, which sounds low by PC standards although a basic 80486 system had 1Mb of memory.

Both of my RISC OS machines take standard PC SIMM memory chips which are easier to get hold of now (especially with a friend in PC hardware). The Risc PC has two slots, and the A7000+ has one slot. I've upgraded my Risc PC to use 65Mb of memory (2 x 32Mb SIMMs), which it hardly ever uses, let alone exceeds, and upgraded my A7000+ with one 16Mb SIMM, which combined with the 8Mb standard memory takes it up to 45Mb.

PCs are extremely memory hungry and it's not unheard of nowadays for systems to even have several hundreds of megabytes or even gigabytes of memory. Even with all this memory they still seem slower than my Acorn A7000+ machine.

Checking free memory

PCs don't appear to report if there's not enough memory to run an application. On my Windows NT system, it would appear that programs just don't run and the user is not informed as to why if there's not enough memory!

Before a program runs on RISC OS, a command in the !Run file checks whether there's enough free memory:

```
WimpSlot -min 672K -max 672K
```

which checks for a minimum amount of free memory of 672K and a maximum memory of 672K before attempting to run. If there's not enough memory to run the program a helpful, friendly message like the following appears: 'Not enough memory to run application. Free up some memory and then try again'. The memory in use can easily be checked in the Task Display.

Memory disc

Some additional software I believe can provide this facility for PCs, but it's not standard, except in the use of virtual memory (see Operating System), which cannot be changed easily by the user.

RISC OS provides the facility for a memory (or RAM) disc, whereby spare computer memory can be used as an additional disc. To start this off open the task display window and look for "RAM Disc". Select+drag the mouse to increase and create the size of the memory for this temporary 'disc'.

Monitor

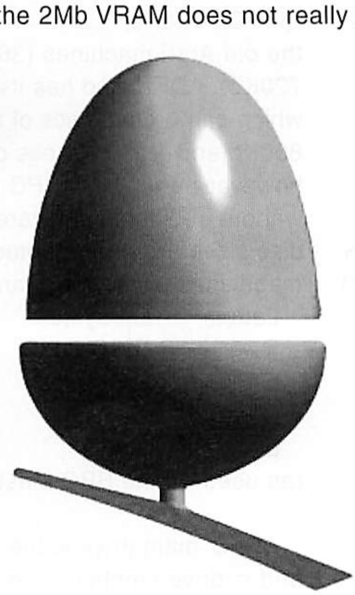
A VGA-style (Video Graphics Array) connector is on pretty much every modern PC system. Most modern PCs can drive a multisync VGA monitor.

Most RISC OS machines have, in my experience, a standard VGA connection that allows the computer to be connected to an Acorn monitor or even a PC VGA or higher quality monitor. Modern PC Multisync VGA monitors work on Acorn hardware. There is an additional graphics card add-on available for the Risc PC called ViewFinder that can greatly enhance the resolution.

Monitor resolution

Windows PCs are far better at handling higher resolutions of monitors than a lot of native RISC OS hardware this is because all Acorn computers were designed to use main memory to hold the graphics image for the screen. Windows PCs expect to have a special video card which provides the graphics facilities. You can get simple cheap ones or extremely powerful ones with lots of facilities including on-board 3D graphics processing.

The Risc PC uses video RAM but as the design is now 10 years old the 2Mb VRAM does not really match up to the needs of modern systems.



The A7000+ running original RISC OS 4.02, can take RISC OS to somewhat higher resolutions without additional hardware. However as I only have a 600x800 second-hand monitor this is not an issue for me. The "Try" option on RISC OS 3 and 4 is completely different to Windows' "Test" option. On Windows, if the screen resolution didn't work, you get to know straight away, and it can be reset as desired.

On RISC OS, the 'try' option seems to be the same as 'Apply' on Windows, the screen is reset in that mode. Great for me when I set the wrong mode on my low-res screen and I get three intermeshed screen images through which I find very hard to see what I am doing. Reboot however restores the original settings, thank goodness!

Keyboard

The RISC OS keyboard is a standard PC-style one and on a machine with separate keyboard (e.g. not A3000, A3010, A3020) is nowadays a PC-style "PS2" keyboard, though it's missing the new "Windows" keys sandwiched between the Ctrl and Alt buttons on newer PC keyboards.

The PS/2 is often quoted in relation to the design of the connector that goes into the back of the computer. This is a small (about 1cm diameter connection), and is so called after the IBM PS/2 PC which pioneered this connection. Some PC keyboards have a 5-din connector (like on an old tape recorder, and older PCs), and converters are available from electronics providers to interface these port types.

My one real bugbear with RISC OS is there is (apparently) little keyboard support for using the WIMP system without the mouse, except on the A4 laptop. Although there are shareware programs for RISC OS, if you do not have these and your mouse fails, your RISC OS system is extremely difficult (if not impossible) to use. Control+Shift+F12 will however allow you to shutdown without a mouse.

On RISC OS machines hardware like keyboard, mouse, printer and so on, can be attached on-the-fly. On PCs they need to be attached prior to starting, otherwise they cannot be used, though apparently this long omitted oversight (in my view) is addressed in Windows XP.

Mice

Most PC mice are two-button affairs (Apple Macs' mice have only one button), and the use of the second (right hand button) came into action in Windows 95. Right-clicking on Windows screens can give a menu, where appropriate.

Acorn decided at the start that they would use three button mice and to name the buttons from left to right "Select", "Menu" and "Adjust". The principle is that Select does the main action, while Adjust does a similar action but a bit different; Menu brings up a context sensitive menu. In essence you could think of a 2-button PC mouse in Windows as having Select and Menu only.

More modern Acorn machines can use a standard PC 3 button PS/2 mouse (a two button one won't give you menus), but older machines like the Risc PC use the "Acorn mouse port", which is easily distinguished by a straight part to the metal connector, and by the fact that a PS/2 mouse will not connect to it, without purchasing a PS2MouseMini connector from Stuart Tyrell Developments (www.stdevel.demon.co.uk). I purchased the older PS2 Mouse hardware from STD, which has worked faultlessly with a brand-new three-button PS/2 mouse ever since my original mouse failed.

Serial Mice can also be used on RISC OS systems, but special software needs to be used to get them to work.

With RISC OS menus you can use either the Select or Menu buttons to choose an item, additionally you can click with Adjust on any menu item and this keeps the menu open, allowing you to do additional tasks without re-opening the menu with an additional click. On Windows the menu needs to be reloaded for each task.

Disc drives

Both types of machine have a history of being bootable from floppy only. PCs very seldom nowadays are booted from floppy, due to the size of the Windows operating system. The old 5.25 inch floppy disc has pretty much disappeared from modern computer systems. Modern PCs can read both old format DOS FAT (File Access Table) and FAT32/NTFS (32bit DOS FAT and Windows NT Filing System) 3.5 inch floppy discs and hard discs.

'Small' RISC OS systems like the A3000, A3010 and A3010 are not fitted with a hard disc as standard, unlike their PC equivalents. This doesn't mean that they are lesser, only that a lot of floppy swapping will be required to use them. The amount of swapping is less than on an elderly non-hard disc PC system, as the majority of the Operating System is stored in ROM. Indeed I bought an A4 laptop where the hard disc had failed, but can still work on it through floppy discs, something modern PCs just cannot do.

Installing a hard disc on an Acorn machine is simplicity itself (especially if the disc has already been formatted by your vendor). Just fit it, and tell the system you have x IDEDrives (either through the Configure application or through the command line *conf. idedrives x, where x is the number of drives). No silly playing about with sizes of cylinders and so on, as on some PCs, it is true plug and play, RISC OS determines the disc's size.

RISC OS machines are bootable from floppy if a hard drive is installed. There are configuration options to change these:

*configure drive n, tells RISC OS which drive to start up with on power-up (where n is 4 for hard disc and 0 for floppy disc).

*configure boot tells RISC OS that this disc should be used to boot the machine from.

*opt 4,2, when entered for the relevant drive indicates that this disc is bootable, and the relevant !Boot file on it should be run.

RISC OS machines can read, write and format discs created on PCs (360Kb, 720Kb, 1.2Mb or 1.44Mb) or the old Atari machines (360Kb and 720Kb). ADFS also has its own formats which can create discs of sizes of 800Kb and 1.6Mb. These cannot however be read on a PC machine without additional software. The Acorn disc sizes are often quoted in magazines or software, and these are:

Letter	Op system	Size
F	RISC OS 3	1.6MB
E	RISC OS	800K
D	ADFS	800K
L	ADFS	640K

(as used on the BBC Master)

ADFS' main drive is the hard disc and is drive number 4. The floppy is drive number 0. Physically these numbers are similar on the PC, but they're hidden from the user by the drive letters.

CDROM / DVD

Most very recent PC systems contain a CDROM drive, and can cater for a DVD drive. Larger Acorn machines can cater for CD-ROM drives (i.e. have physical

space for them), and discs are formatted in PC CDROM formats. Castle computers can install a DVD drive in their Risc PCs (presumably used in PC mode), but so far there's no DVD driver software for RISC OS. Pity.

Networking

Networking is an arcane subject on almost any machine. The Apple Mac is probably the easiest machine in the world to network with all the nastiness hidden and peer-to-peer networking being only a matter of plugging the cables in all Macs have networking hardware built-in and (nearly) always have.

RISC OS machines have no real problem with networks using their proprietory peer-to-peer ShareFS system, this is as easy to use as a Mac, but the hardware hasn't been included as standard so needs to be bought. However newer machines from Riscstation do have the hardware built-in.

Home PCs don't usually have networking hardware built-in though it is getting more common there wasn't proprietory peer-to-peer protocols in the earlier home versions of Windows but things are changing there too. Networking is now becoming a common requirement and is on most people's wanted lists even if not an essential.

RISC OS computers can share a network with PCs and Macs and communicate with them using various software.

MIDI

MIDI is used for controlling electronic musical instruments. Currently only the Riscstation comes with MIDI as standard and softwre to use it. The Riscstation desktop machines also come with a slot for a plug-in music synthesizer.

Most PCs do have MIDI ports as it is part of the standard I/O components, which is why the Riscstation has it too.

Laptops

Acorn only ever produced one laptop machine, the Acorn A4. Users of this machine swear by it, and have been soldiering on using them, though it can only run an early version of RISC OS 3.10. Having just acquired one of these wonderful machines, I can see why it is so well regarded. My 4MB machine is a great deal faster than my work Celeron laptop with 192MB of memory, and this A4 is a machine that's now 10 years old.

Until very recently the A4 was the only RISC OS laptop ever produced, but that is set to change when the Riscstation portable appears. This machine has been on the drawing board for a considerable length of time, with loyal RISC OS users awaiting its appearance. It now is almost about to appear for those who have ordered them.

In future articles we shall take compare the operating systems in more detail and then examine the bundled software.

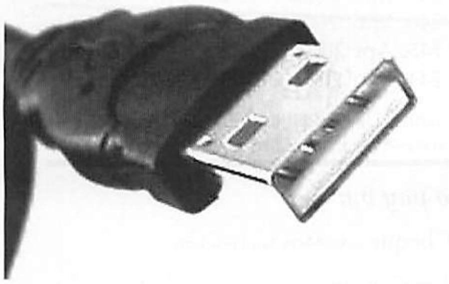
Andy Burgess
ajburgess@argonet.co.uk

What is USB?

Anyone who has been around computers for more that two or three years knows the problem that the Universal Serial Bus is trying to solve, in the past, connecting devices to computers has been a real headache.

• Printers connected to parallel printer ports, and most computers only came with one. Things like Zip drives, which need a high-speed connection into the computer, would use the parallel port as well.

• Modems used the serial port, but so did some printers and a variety of odd things like Palm Pilots and digital cameras. Computers have at most two serial ports and they can be very slow.



• Devices that needed faster connections came with their own cards. Unfortunately, the number of card slots is limited and you needed a degree to install some of the cards.

The goal of USB is to end all these headaches. The Universal Serial Bus gives you a single, standardised, easy-to-use way to connect up to 127 devices to a computer. Each device can consume up to a maximum of six megabits per second (Mbps) of bandwidth, which is fast enough for the vast majority of peripheral devices that most people want to connect to their machines.

Now we we have looked at USB basics before but we thought we would take an overview of the subject and see if there is some little corners we have yet to examine.

Connecting a USB device to a computer is simple, you find the USB connector on the back of your machine and plug the USB connector into it. The thin rectangular socket is a typical USB socket on the back of the computer. This is the "A" connector.

If it is a new device, the operating system auto-detects it and asks for the driver disc. If the device has already been installed, the computer activates it and starts talking to it. USB devices can be connected and disconnected at any time.

Many USB devices come with their own built-in cable, and the cable has an "A" connection on it. If not, then the device has a socket on it that accepts a USB "B" connector. "A" connectors head "upstream" toward the computer. "B" connectors head "downstream" and connect to individual devices.

By using different connectors on the upstream and downstream end, it is impossible to ever get confused, if you connect any USB cable's "B" connector into a device, you know that it will work. Similarly, you can plug any "A" connector into any "A" socket and know that it will work.

Running out of ports?

With so many USB devices on the market today, you easily run out of sockets very quickly. So how do you hook up all the devices? A typical USB four-port hub accepts four "A" connectors.

You plug the hub into your computer, and then plug your devices (or other hubs) into the hub. By chaining hubs together, you can build up dozens of available USB ports on a single computer.

Hubs can be powered or unpowered. A high-power device like a printer or scanner will have its own power supply, but low-power devices like mice and digital cameras get their power from the bus in order to simplify them. The power comes from the computer.

If you have lots of self-powered devices (like printers and scanners) your hub does not need to be powered. If you have lots of unpowered devices like mice and cameras, you probably need a powered hub.

Individual USB cables can run as long as 5 meters; with hubs, devices can be up to 30 meters (six cables' worth) away from the host.

Inside a USB cable there are two wires for power, +5 volts (red) and ground (brown), and a twisted pair (yellow and blue) of wires to carry the data. The cable is also shielded.

When the host powers up, it queries all of the devices connected to the bus and assigns each one an address. This process is called enumeration, devices are also enumerated when they connect to the bus. The host also finds out from each device what type of data transfer it wishes to perform:

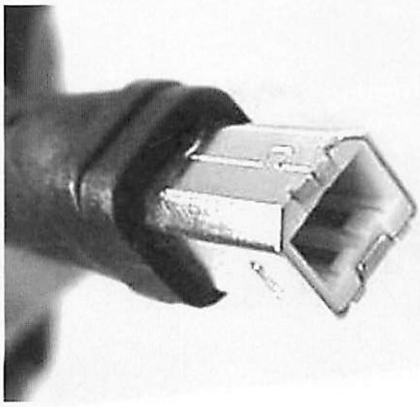
• Interrupt, a device like a mouse or a keyboard, which will be sending very little data, would choose the interrupt mode.

• Bulk, a device like a printer, which receives data in one big packet, uses the bulk transfer mode. A block of data is sent to the printer (in 64-byte chunks) and verified to make sure it is correct.

• Isochronous, a streaming device (such as audio speakers) uses the isochronous mode. Data streams between the device and the host are in real-time, and there is no error correction.

The host can also send commands or query parameters with control packets.

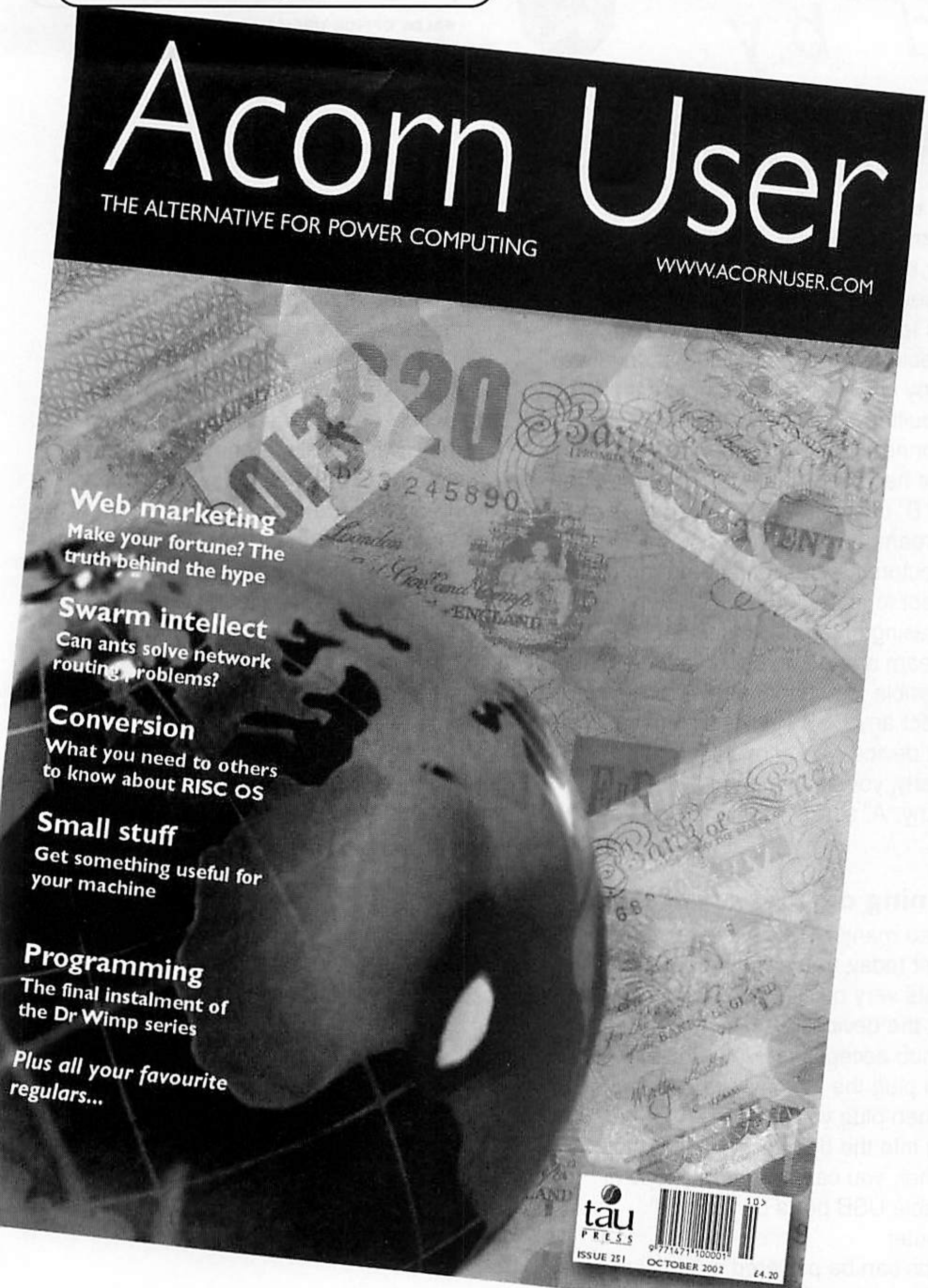
As devices are enumerated, the host is keeping track of the total bandwidth that



all of the isochronous and interrupt devices are requesting. They can consume up to 90 percent of the 12Mbps of bandwidth that is available. After 90 percent is used up, the host denies access to any other isochronous or interrupt devices. Control packets and packets for bulk transfers use any bandwidth left over (at least 10 percent).

The USB divides the available bandwidth into frames, and the host controls the frames. Frames contain 1,500 bytes, and a new frame starts every millisecond. During a frame, isochronous and interrupt devices get a slot so they are guaranteed the bandwidth they need. Bulk and control transfers use whatever space is left.

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New technology for all

Information Technology should be designated a basic skill along with literacy and numeracy, with free computer courses for all, according to an independent report published recently.

The report from the taskforce on e-learning, headed by Steve Morrison, looked at how to make post-16 learning easier to access, more flexible and suited to the needs of individuals using new technologies.

The report includes the following recommendations: Firstly, Information and Communication Technology (ICT) should be designated a basic skill by 2010 along with literacy and numeracy. This would give everyone access to free courses to improve their basic IT skills but focussing initially on 16-18 year olds in full or part-time study; those in Modern Apprenticeships; the unemployed and people in part-time work.

Next in line is the creation of College Online an expansion of Curriculum Online into the post-16 sector. This would give teachers and tutors in the post-16 sector access to a bank of online learning resources to use with their students to help make learning more exciting. Following this would be a National Mentoring Programme with 5,000 additional e-learning mentors to support tutors online with a central database at www.mentornet.org.uk

As well as the development of an online careers adviser called Which Way? This aim being to give people easy access to advice on the most suitable learning for them right the way through to job opportunities. In addition, improvements in work-based learning will be incorporated with small businesses supported and offered incentives to provide relevant occupational online learning. Investors in People UK should include access to e-learning opportunities as standard as part of its strategy to engage more small businesses.

Commenting on this, Estelle Morris said: "Everyone should have the opportunity to continually update and improve their skills, crucial for their own career development and for a competitive economy. But sometimes people can't access the learning they need because courses simply don't fit around their daily lives.

"New technologies open up huge opportunities to give people access to the learning they want in a way that suits their needs.

"The success of LearnDirect has shown the potential of online learning. This report looks at how to use new technology in post-16 learning to maximum effect to give people even greater flexibility and choice."

Watch this space.

Is the UK online?

August saw the release of three new research reports on adult access ICT. For starters, Trends in ICT Access and Use gathered data from 3,900 adults in randomly selected households. People living in council estates with high unemployment have experienced a strong growth in current use of ICT compared to August/September 2000 - up by 18 percentage points for Internet use to 34 per cent.

Looking at UK Online centres in particular was a follow-up study by Hall Aitken Associates. Looking in particular at the early users of the centres - one year on from their first involvement - found half of all respondents indicating that attendance at the centres had definitely helped them secure a job, secure a better job or move on to further education or training. Interestingly, 85 per cent of respondents said that coming to their local centre had increased their confidence to some degree.

Finally, a survey of new users of recently-opened centres found very high levels of progress. For example, 27 per cent claimed that attendance at an Online Centre had helped them progress onto LearnDirect courses and 16 per cent that it has helped them progress to Further Education or Higher Education.

More old rubbish

Recycling hits the Web with a site produced by the Department for Environment, Food and Rural Affairs. Designed to help make it easy for you to 'do your bit' in the constant battle to reduce waste in this country, it explains the problems caused by excessive waste, and offers suggestions for how everyone can reduce the amount of waste they produce, reuse items instead of throwing them away, and recycle what can't be reused. Find it yourself at www.useitagain.org.uk

Scottish fun

A school in Lamlash on the Isle of Arran played host to Jack McConnell, First Minister of Scotland recently. His task was to launch GridClub, www.gridclub.com Basically this is a free online service with fun learning activities for 7-11 year olds, which will be extended in coming months supported by NGfL Scotland funding.

Espresso attention

For subscribers to Espresso, there is a new addition to the Your Espresso series where LEA' and EAZs create video-rich resources about their local area to stimulate learning and support teachers. Called Look and Find Corby the new module aims to help children develop a pride in their local community by teaching them about the town's history but useful for anyone looking to compare similar or dissimilar localities.

The resource contains videos, photographs, archive material, relevant Web sites and activities based on local landmarks such as Rockingham Castle, Kirby Hall and a medieval church. A nice feature is where local people have been interviewed about their recollections of Corby and workers who made their living in the steelworks tell their stories of how they came to live in the area and the changes they have seen.

Any LEA or EAZ can apply to have a Your Espresso created for their schools. It can take the form of an add-on for subscribers to the broadband service or be delivered on CD-ROM. To find out more contact Espresso Education on 020 8237 1200.

Virtually fun

See how science is used in the real world by going on a virtual journey to the Pfizer site in Sandwich. Called the Pfizer Science Jamboree you can visit by logging on to www.pfizerscienceisfun.org.uk

Pupils can see how science is used in the everyday lives of the staff as well as watch demonstrations of science in action from chemists, biologists, engineers and chefs!

Mouthcare

Gnashers are the theme of a new site at www.teethwise.org which can be used independently but follows up on the BCCCA Services to Education's video and card pack Teethwise.

The Web site contains seven curricular-based downloadable ICT activities, background information, clipart, printable cards for Key Stages 1 and 2 providing ideas and stimulus for discussion in science of PHSE.

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educ@acornuser.com

Learning online

One of the unwritten rules about an educational Web site is that it should be fun. I wouldn't necessarily agree with this especially when some sites get carried away with the fun aspects and lose sight of the ball completely. So does Webmonkey manage to get the balance right?

This is a site with a purpose, to teach children how to build their own Web site without scaring away their teachers! So what does **http://hotwired.lycos.com/webmonkey/kids/** provide?

American, free and easy to access. It has a simple, bright and attractive look which is quick to download and follows the principles it wishes to teach. The first page hits you with four buttons: Lessons, Projects, Playground and Tools.

School time

Off to school and the lessons are split into sections: Basics, Learning HTML, Graphics and Gizmos and finally, Layout.



So let's look at the basics.

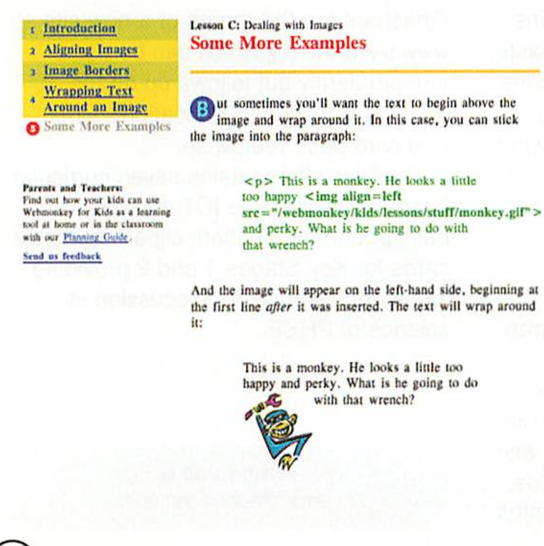
There's no too much text on the pages and the prose is amusing and written for children, non-threatening and not particularly boy or girl themed. If nothing else use this as a guide for teachers who want a brief and non-tech-heavy definition of the Internet. The only negative is that there is no mention of any other system than PC or browser than Navigator or Explorer. For balance other computer platforms and programs should be emphasised because of the Internet philosophy.

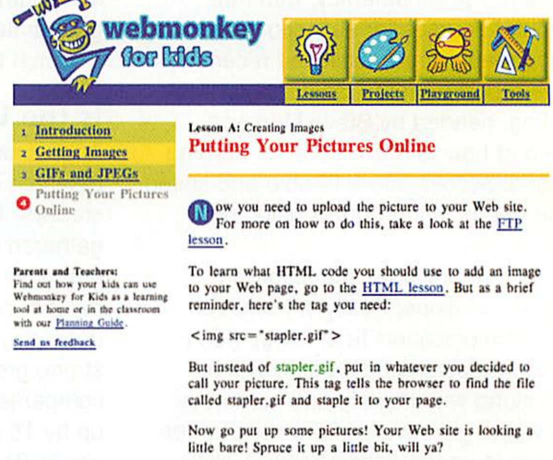
I don't like reading on the Internet much but here the design and content has been thought about and broken into manageable bites. This makes the information easily to absorb and keeps you reading. So I looked forward to the next lesson on Web Design

The emphasis here is on planning with an interesting example of using staplers! The tips start with planning with paper and pencil and makes the process seem very easy. I particularly liked the advice about planning and not worrying how to do it yet. The emphasis on audience in the Get Organised section is a great link to Literacy as well as teaching a lesson that a lot of professional Web designers forget, you need to make it easy for people to visit your site.

Having done the planning children are now eased into HTML by looking at other people's code by encouraging them to find a site they like and choosing Source or Page Source and learn new tricks. However, I approved on the section entitled 'Don't Be a Big Thief' which discouraged old-fashioned plagiarism while steering new designers towards templates.

This introduction section finishes with getting it on to the Web, covering the essentials of ISPs and in particular free Web servers and FTP. Being a US site it chooses Tripod but the basics work whatever ISP you choose.

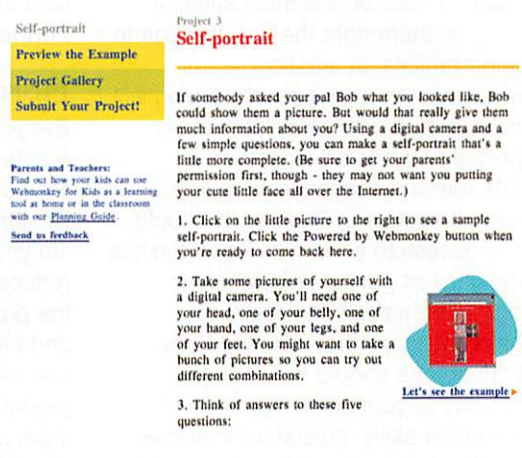




Again this is all done in accessible language avoiding unnecessary detail but explaining technical terms and jargon.

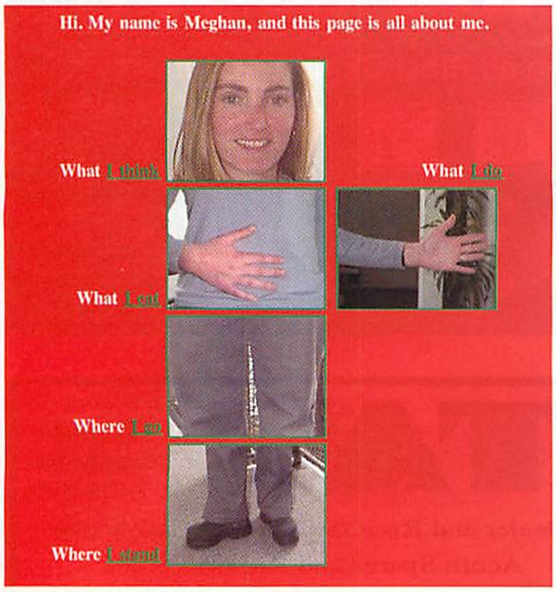
Now we're learning HTML and getting ideas into text. I really liked the down-to-earth way HTML is explained with good practical detail on using tags. You might even believe it's easy, all you need is a text editor, in our case Edit will do, and your hand is firmly held through creating your first page from the first <html> and <b>.

I particularly liked the trouble-shooting sorting out the tags before moving on to creating images through a graphics



package, digital camera, scanner, PhotoCD, or clip-art and saving them as JPEGs and GIFs and adding to your Web page using the correct tag. This could do with a bit more explanation and perhaps more hand holding.

The site even gives an example of use GIF animations but while it suggests



some good and free GIF creation programs and explains well the principles behind animated GIFs, unfortunately, these are only for the PC and Mac. Acorn users may need to acquire these ready-made from other sites. Once got you're then advised on how and why to and not to use them.

Again thinking about your audience and their equipment plus some excellent tips such as: The first frame should always be the biggest, because it sets the screen size of the whole animation and also determines the background colour. Add to this information on looping your GIFs and you get a lot of information on all aspects of handling animated GIFs.

Then there's information and a detailed guide to building tables, with examples and advice I could have really done with the first time I started messing around with these from colspan to alignment and padding.

You can start at the beginning and move through systematically or pick up the lesson or part of lesson you want. So if you wanted to explore frames you could start with their definition: frames is kind of like a picnic plate full of food, the sort of plate that has different sections with the raised part in between. You know the type: It has a big part for the main course, a little section for the salad, and a little section for the dessert. Before continuing the analogy and moving on to show you how to create your own "frameset."

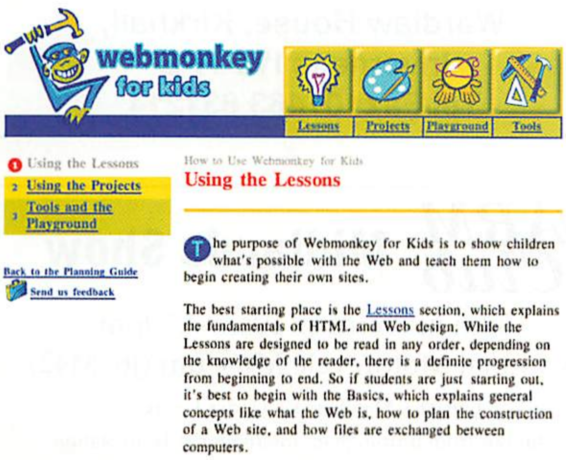
Also covered is the nesting of framesets all done in a worked example dividing framesets by percentage and by picking the number of pixels.

In addition there is information on counters, guestbooks, chat rooms, mailing lists, quizzes and forms as well as free e-mail and sites that will provide you with these for at no cost. Just copy and paste the HTML code into your own page and you'll be ready to go. The bottom line being that jazzing up a page doesn't have to be all that hard.

Having finished your lessons it's now on to the projects. First of all you pick a project, birthday invitation, colours, self-portrait, online report or a slideshow, before experimenting with the example project to make it your own: "Just steal our code. We won't mind." All you're doing is editing the HTML code plus WebMonkey has added some extra instructions in the code to help you along the way.

Grown-up help

All the way through teachers are encouraged to access a planning page full of information on how to use Webmonkey with kids. This explains the rationale behind the projects but also advice on when to let children loose on these.



Playtime and toolkits

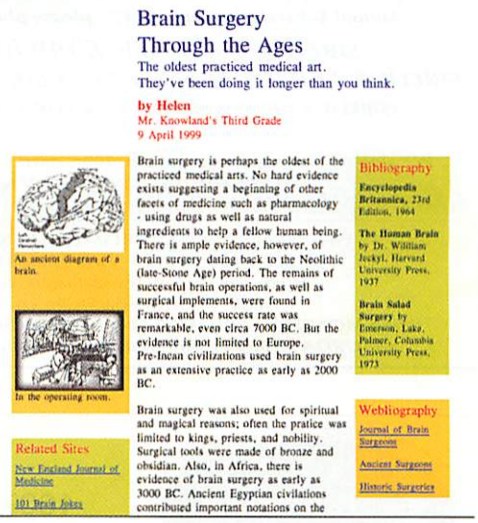
Back on the homepage, but accessible at any time are the Playground and the Tools. The latter is something most RISC OS users can happily skip as it provides links to PC and Mac programs for writing HTML, creating graphics, and uploading files. Yet within this is the Links section including a list of kid-created sites. A good idea if you (or your students) feel that this is way beyond them.

Also tucked away within Tools is a reference section, which includes an HTML Cheat Sheet, all of the tags on one big printable page, as well as a list of special characters such as the codes necessary to make stuff like Â© and & appear on a Web page, and a list of colour codes indeed all of the Web-safe colours and their accompanying hexadecimal codes.

Finally, there's the Playground, where you can watch some interesting bits and pieces such as: Why Monsters Don't Get Hired and Snail Detective. However, these require Shockwave and are purely recreational.

All's well that end's well

I really enjoyed using this site. It was free, well-designed, informative and easy to use. You can use it in its entirety and build a whole series of lessons around it



with most of the hard work done for you. However, you can use it to drop into to find some leads or alternative approaches.

The projects are do-able, pages that children want to and can create and don't require you to be a Web genius. The emphasis on planning what you are creating and thinking about your audience is excellent and ties well into Design and Technology as well as Literacy.

It also lays down the gauntlet for a RISC OS site to do the same thing ...

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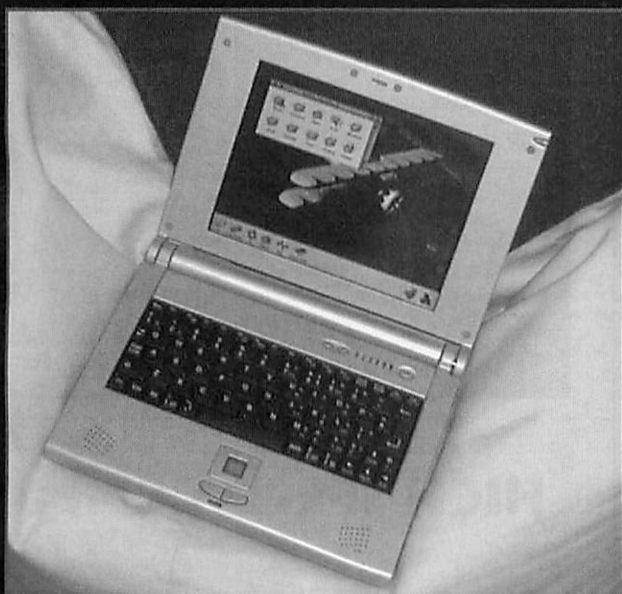
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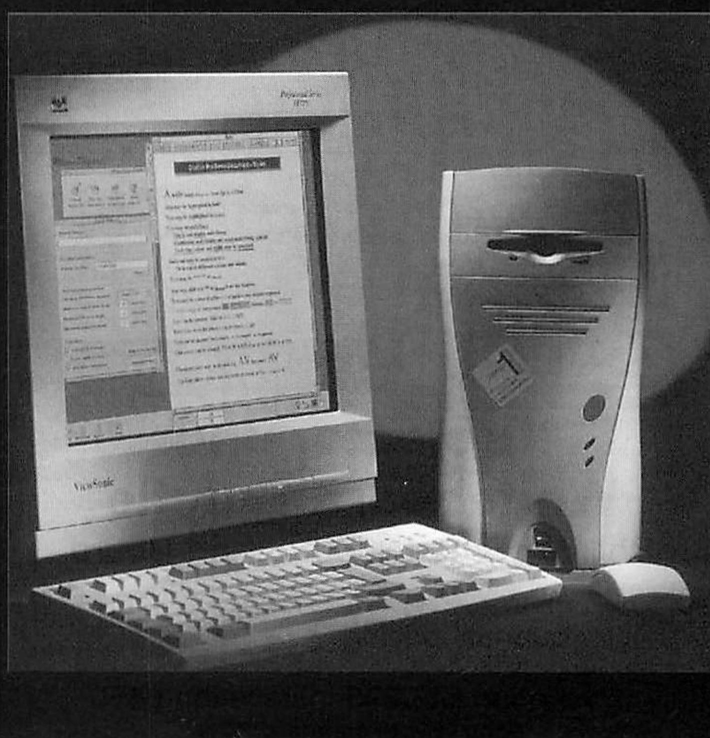




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USB serial linkages

Further to Robin Hampshire's letter in the September issue of Acorn User, I can confirm that we are working on a USB driver for SerialDev applications, so that any old serial device which now has a USB equivalent should work without modification of application software, just by changing the driver used.

Such devices include barcode scanners and 56k modems and I intend to have drivers for Castle, Simtec and Microdigital interfaces.

Further information will follow in due course.

Alan Gibson
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Liquid Silicon

This is excellent news, of course, and hopefully other types of class drivers will soon become available. Incidentally some people have expressed concern that there may be two or three "standards" for USB in our market.

I have discussed this with someone who has experience in this area. Obviously it would be a happier situation if RISCOS Ltd had managed to issue a standard API (application programmers interface) for it, they wouldn't even have had to actually program anything, just state what the API must be.

However the key point here is that setting up the data "pipes" is what the API is primarily for and that is the easy part of a USB driver. The hard part is managing the data that travels up and down the pipes, and this would be the same code for every USB version.

Robin Humphries has been busy and he has sent us another query...

Stringing it up

I'm trying to obtain a copy of a module called StringUtils. This was supplied on the Acorn User disc for issue 151 in January 1995.

Can you help?

Robin Humphries
by e-mail

All the floppy disc contents have been put on to CD although we are not entirely sure which one this was available on perhaps a reader has a better idea, or even a copy they could send along and we will forward it to Robin.

Competition results

In the June, July and August issues of Acorn User we had a whole string of excellent competitions so we thought that you would probably like to know who had won them.

JUNE

First up was the June competition from the Electronic Font Foundry and the chance to win one of three copies of the latest high quality font CD.

The question we asked was: The built-in RISC OS font Trinity is named after a college from which university. Oxford, Cambridge or Durham.

The answer was, of course, Cambridge home of Acorn. The three lucky winners of this competition are:

B. Soper of Scarborough
Colin Carnegie of Belfast
Adrian Denney of Leicester

JULY

In July we had a valuable competition from Spellings Computer Services who also run the Association of Acorn User Groups to provide the winner with full Web services for two years. And the winner for this is:

Meg Privett of Honiton

AUGUST

And then in August we had a competition to win one of three copies of the latest version of Schema 2 plus the Excell translation software to go with it. We asked what built-in formula you would use to add up all the values in a row or column providing the options of LN(), FLOOR() and SUM(). The answer was the latter and the three lucky winners are:

D T Heatherington of Co Durham
J B Lancaster of Welwyn Garden City
Daniel Mews of Kidderminster

Well done to everyone and watch out for more competitions throughout the Autumn season.

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